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## ***Chapter 15***



# ***Instruments and Photographic Equipment (SIC Code 38)***

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## **A Look at the Instruments and Photographic Equipment Industry (SIC Code 38)**

The instruments and photographic equipment industry (SIC code 38) produces instruments and equipment for a variety of purposes as indicated by its full title: measuring, analyzing, and controlling instruments; photographic, medical, and optical goods; watches and clocks (see Box 15-1).

Instruments and controls manufactured in SIC code 38 include search and navigation equipment such as radar and sonar, laboratory apparatus, environmental controls such as thermostats for residential and commercial use, and industrial instruments to measure, display and control process variables. The sector produces medical instruments, equipment, and supplies (including x-ray apparatus) and ophthalmic goods (such as eyeglasses).

Photographic goods produced in this sector include not only equipment and parts, but also photographic film, paper, and chemicals. Box 15-1 lists Standard Industrial Classification (SIC) codes and their designations for this sector. In TRI, SIC codes are given as reported by the facilities; these may differ from information in economic and other data collections.

The instruments and photographic equipment sector shipped products valued at \$151.02 billion in 1996, up from \$144.72 billion in 1995 (both in current dollars). However, the sector's employment decreased from 831,000 in 1995 to 821,000 in 1996. This sector has shown little growth in the 1990s, but it has also been one of the more economically stable sectors. From 1989 to 1996, production in this sector increased 4.7%, compared to 17.6% for all U.S. manufacturing. During those years, however, production in the instruments and photographic equipment sector never fell below the 1989 level (see Chapter 1, Table 1-10).

At the four-digit SIC code level, the search and navigation equipment industry (SIC code 3612) shipped products valued at \$30.37 billion in 1996. The photographic equipment industry (SIC code 3861) shipped products valued at \$22.30 billion. Two other industries in this sector had shipments valued at more than \$15 billion in 1996: surgical and medical instruments (SIC code 3841) with \$17.04 billion and surgical appliances (SIC code 3842) with \$15.87 billion. As noted throughout this chapter, the manufacture of photographic equipment and supplies in SIC code 3861 was associated with the sector's largest releases and waste management of TRI chemicals. Production of surgical, medical, and dental instruments (industries in SIC code 384, at the three-digit level) also contributed significantly to the sector's TRI reporting.



## Chapter 15 — TRI Data for Instruments and Photographic Equipment

### Box 15-1. SIC Code 38, Measuring, Analyzing, and Controlling Instruments; Photographic, Medical, and Optical Goods; Watches and Clocks: Codes and Classifications

| SIC Code   | Industry Description   |
|--|--|
| <b>381 Search, Detection, Navigation, Guidance, Aeronautical, and Nautical Systems, Instruments, and Equipment</b> |  |
| 3812 Search, Detection, Navigation, Guidance, Aeronautical, and Nautical Systems and Instruments                   | Manufacture of search, detection, navigation, guidance, aeronautical, and nautical systems and instruments. Includes radar and sonar; countermeasures equipment; aircraft and missile control systems; flight and navigation sensors, transmitters, and displays; and gyroscopes.  |
| <b>382 Laboratory Apparatus and Analytical, Optical, Measuring, and Controlling Instruments</b>                    |  |
| 3821 Laboratory Apparatus and Furniture  | Manufacture of laboratory apparatus and furniture, including laboratory balances and scales, furnaces and ovens, and centrifuges.  |
| 3822 Automatic Controls for Regulating Residential and Commercial Environments and Appliances                      | Manufacture of temperature and related controls for heating and air-conditioning installations and refrigeration applications. Manufacture of automatic regulators used as components of household appliances.   |
| 3823 Industrial Instruments for Measurement, Display, and Control of Process Variables; and Related Products       | Manufacture of industrial instruments and related products for measuring, displaying, transmitting, and controlling process variables in manufacturing, energy conversion, and public service utilities.   |
| 3824 Totalizing Fluid Meters and Counting Devices  | Manufacture of totalizing (registering) meters that monitor fluid flows, such as water and gas meters. Production of mechanical and electromechanical counters and associated metering devices.  |
| 3825 Instruments for Measuring and Testing of Electricity and Electrical Signals                                   | Manufacture of instruments for measuring the characteristics of electricity and electrical signals, such as voltmeters, ammeters, demand meters, and equipment for testing electrical, radio, and communication circuits and electrical characteristics of internal combustion engines.  |
| 3826 Laboratory Analytical Instruments   | Manufacture of laboratory instruments and instrumentation systems for chemical or physical analysis of the composition or concentration of samples of solid, fluid, gaseous, or composite material.  |
| 3827 Optical Instruments and Lenses  | Manufacture of instruments and apparatus that measure an optical property and optically project, measure, or magnify an image, such as binoculars, microscopes, prisms, and lenses.  |
| 3829 Measuring and Controlling Devices, nec*   | Manufacture of miscellaneous measuring and controlling devices, including meteorological instruments. Includes equipment to test physical properties, instrumentation to detect and measure nuclear radiation, aircraft engine instruments, and thermometers. Also includes surveying and drafting instruments.                              |
| <b>384 Surgical, Medical, and Dental Instruments and Supplies</b>  |  |
| 3841 Surgical and Medical Instruments and Apparatus  | Manufacture of medical, surgical, ophthalmic, and veterinary instruments and apparatus.  |
| 3842 Orthopedic, Prosthetic, and Surgical Appliances and Supplies  | Manufacture of orthopedic, prosthetic, and surgical appliances and supplies; arch supports and other foot appliances; fracture appliances, elastic hosiery, abdominal supporters, braces, and trusses; bandages; surgical gauze and dressings; sutures; adhesive tapes and medicated plasters; and personal safety appliances and equipment. |
| 3843 Dental Equipment and Supplies   | Manufacture of artificial teeth, dental metals, alloys, and amalgams, and equipment, instruments, and supplies used by dentists, dental laboratories, and dental colleges.   |
| 3844 X-ray Apparatus and Tubes and Related Irradiation Apparatus   | Manufacture of radiographic, fluoroscopic, and therapeutic X-ray apparatus and tubes for medical, industrial, research, and control applications. Manufacture of other irradiation equipment, including gamma and beta-ray equipment.  |
| 3845 Electromedical and Electrotherapeutic Equipment   | Manufacture of electromedical and electrotherapeutic apparatus.  |
| <b>385 Ophthalmic Goods</b>  |  |
| 3851 Ophthalmic Goods  | Manufacture of ophthalmic frames, lenses, and sunglass lenses.   |

\*nec: not elsewhere classified; these are generally referred to as "miscellaneous" products in their categories.



**Box 15-1. SIC Code 38, Measuring, Analyzing, and Controlling Instruments; Photographic, Medical, and Optical Goods; Watches and Clocks: Codes and Classifications, Continued**

| SIC Code  | Industry Description  |
|---|---|
| <b>386 Photographic Equipment and Supplies</b>                    |   |
| 3861 Photographic Equipment and Supplies                          | Manufacture of photographic apparatus, equipment, parts, attachments, and accessories; photocopy and microfilm equipment; blueprinting and diazotype (white printing) apparatus, and other photographic equipment. Manufacture of sensitized film, paper, cloth, and plates, and prepared photographic chemicals for use with photographic equipment. |
| <b>387 Watches, Clocks, Clockwork Operated Devices, and Parts</b> |   |
| 3873 Watches, Clocks, Clockwork Operated Devices, and Parts       | Manufacture of clocks (including electric), watches, watchcases, mechanisms for clockwork-operated devices, and clock and watch parts. Assembly of clocks and watches from purchased movements and cases.   |

\*nec: not elsewhere classified; these are generally referred to as “miscellaneous” products in their categories.

The manufacture of instruments and photographic equipment involves processes common to some other industrial sectors, such as fabrication of metal products, production of articles from plastics materials or glass, and manufacture of electronic equipment. However, in the instruments and photographic equipment sector, some products may require machining to finer tolerances or testing to stricter product and performance standards. Many medical and surgical products, for example, must meet additional criteria such as the ability of pacemakers to withstand sterilization in an autoclave.

Photographic equipment and supplies (SIC code 3861) ranked first in this sector for releases and for production-related waste in 1996. Recycling is common in photographic film manufacture, to recover valuable silver from wastes. Traditional silver-based processes continue to dominate the photographic industry’s market, although new techniques (such as digital photography) are advancing. Manufacture of photographic film generally begins with production of a thin sheet of plastic from a cellulose acetate base (a solvent-based process). Silver nitrate, produced by dissolving silver in nitric acid, is added to a gelatin chemically treated with iodide and potassium bromide, yielding an emulsion of silver halide salts.

### Sources

Executive Office of the President, Office of Management and Budget, *Standard Industrial Classification Manual*, 1987: Standard Industrial Classification (SIC) codes and industry descriptions.

U.S. *Industry & Trade Outlook '98*, DRI/McGraw Hill, Standard & Poor’s, and U.S. Department of Commerce, International Trade Administration, 1998: economic analyses, also provides some information on environment and industrial processes for selected industries.

U.S. Census Bureau, *1996 Annual Survey of Manufactures: Statistics for Industry Groups and Industries*, M96(AS)-1, February 1998 <<http://www.census.gov/prod/www/titles.html#mm>>: value of shipments and employment. Supplemental data from U.S. Census Bureau <<http://www.census.gov>> for some industries.

*How Products Are Made: An Illustrated Guide to Product Manufacturing*, Gale Research, 1996: industry processes and technologies.

*McGraw-Hill Encyclopedia of Science and Technology*, 8th ed., 1997: industry processes and technologies.



## Chapter 15 — TRI Data for Instruments and Photographic Equipment

**Table 15-1. Summary of TRI Information by 4-digit SIC Code, 1996: Instruments and Photographic Equipment, SIC Code 38**

| Total On- and Off-site Releases Rank | Total Production-related Waste Rank | SIC Code | Industry                              | Total Facilities Number | Total Forms Number | Form As Number | Total On-site Releases Pounds | Total Off-site Releases Pounds | Total On- and Off-site Releases Pounds |
|--------------------------------------|-------------------------------------|----------|---------------------------------------|-------------------------|--------------------|----------------|-------------------------------|--------------------------------|--|
| 9                                    | 12                                  | 3812     | Search & Navigation Equipment         | 11                      | 13                 | 1              | 125,441                       | 4,000                          | 129,441                                |
| 10                                   | 14                                  | 3821     | Laboratory Apparatus & Furniture      | 10                      | 22                 | 5              | 99,184                        | 265                            | 99,449                                 |
| 4                                    | 3                                   | 3822     | Environmental Controls                | 19                      | 62                 | 4              | 438,113                       | 66,290                         | 504,403                                |
| 11                                   | 7                                   | 3823     | Process Control Instruments           | 15                      | 23                 | 2              | 74,703                        | 0                              | 74,703                                 |
| 14                                   | 9                                   | 3824     | Fluid Meters & Counting Devices       | 7                       | 19                 | 3              | 34,833                        | 1,005                          | 35,838                                 |
| 18                                   | 11                                  | 3825     | Instruments to Measure Electricity    | 5                       | 9                  | 1              | 1,156                         | 0                              | 1,156                                  |
| 17                                   | 18                                  | 3826     | Analytical Instruments                | 2                       | 2                  | 0              | 11,000                        | 0                              | 11,000                                 |
| 5                                    | 8                                   | 3827     | Optical Instruments & Lenses          | 7                       | 12                 | 1              | 55,249                        | 425,442                        | 480,691                                |
| 8                                    | 10                                  | 3829     | Measuring & Controlling Devices, nec* | 9                       | 17                 | 0              | 146,866                       | 0                              | 146,866                                |
| 2                                    | 2                                   | 3841     | Surgical & Medical Instruments        | 70                      | 121                | 7              | 1,594,470                     | 70,351                         | 1,664,821                              |
| 6                                    | 4                                   | 3842     | Surgical Appliances & Supplies        | 27                      | 45                 | 4              | 462,966                       | 13,061                         | 476,027                                |
| 13                                   | 15                                  | 3843     | Dental Equipment & Supplies           | 14                      | 19                 | 0              | 31,275                        | 5,450                          | 36,725                                 |
| 12                                   | 13                                  | 3844     | X-ray Apparatus & Tubes               | 4                       | 13                 | 0              | 26,942                        | 11,910                         | 38,852                                 |
| 15                                   | 16                                  | 3845     | Electromedical Equipment              | 7                       | 9                  | 0              | 20,692                        | 7,100                          | 27,792                                 |
| 7                                    | 6                                   | 3851     | Ophthalmic Goods                      | 16                      | 27                 | 0              | 395,622                       | 48,258                         | 443,880                                |
| 1                                    | 1                                   | 3861     | Photographic Equipment & Supplies     | 49                      | 251                | 15             | 10,407,088                    | 189,101                        | 10,596,189                             |
| 16                                   | 17                                  | 3873     | Watches, Clocks, Watchcases & Parts   | 3                       | 3                  | 1              | 26,500                        | 0                              | 26,500                                 |
| 3                                    | 5                                   |          | Multiple within SIC Code 38           | 16                      | 40                 | 2              | 549,403                       | 6,335                          | 555,738                                |
|                                      |                                     |          | Total for SIC Code 38                 | 291                     | 707                | 46             | 14,501,503                    | 848,568                        | 15,350,071                             |

**Note:** **On-site Releases** from Section 5 of Form R. **On-site Waste Management** from Section 8 of Form R. **Off-site Releases** from Section 6 (transfers off-site to disposal) of Form R. **Total Transfers Off-site for Further Waste Management** from Section 6 (excluding transfers off-site to disposal) of Form R. **Total Production-related Waste** sums Section 8 (Current Year, Column B) of Form R, except: **Non-production-related Waste** (remedial/catastrophic incidents). Facilities/forms with more than one 4-digit SIC code within SIC code 38 are assigned to the "multiple" category. There may be forms but no facilities in a single 4-digit SIC code because a facility reported different 4-digit SIC codes in SIC code 38 on its individual forms.

\*nec: not elsewhere classified.

## 1996 TRI Data for Instruments and Photographic Equipment

Table 15-1 summarizes TRI reporting by the instruments and photographic equipment sector for 1996. The sector submitted 707 forms in 1996. Of these, 46 were Form A certification statements, certifying that a facility's total annual reportable amount of a TRI chemical was less than 500 pounds for the year and that the facility did not manufacture, process, or otherwise use more than 1 million pounds. (The Form A certification statement is explained in Chapter 1.)

The photographic equipment industry (SIC code 3861) submitted the sector's largest number of

forms, 251 or 35.5% of the total. The surgical and medical instruments industry (SIC code 3841) ranked second with 121 forms, or 17.1%. Ranking third, the environmental controls industry (SIC code 3822) submitted 62 forms, or 8.8%.

The photographic equipment industry (SIC code 3861) also ranked first in the instruments and photographic equipment sector for all categories of TRI reporting summarized in Table 15-1, except off-site releases. This industry reported 10.6 million pounds of total on- and off-site releases, including 10.4 million pounds of on-site releases. These amounts were approximately 70% of the sector's total on- and off-site releases of 15.4 million pounds and on-site releases of 14.5 million pounds. The photographic equipment industry also reported 36.7 million pounds of other on-site waste management, 86.2% of the sector's 42.5 million-



**Table 15-1. Summary of TRI Information by 4-digit SIC Code, 1996: Instruments and Photographic Equipment, SIC Code 38, Continued**

| SIC Code | Industry                              | Total Other On-site Waste Management Pounds | Total Transfers Off-site for Further Waste Management Pounds | Total Production-related Waste Pounds | Non-Production-related Waste Pounds |
|----------|---------------------------------------|---|--|---------------------------------------|-------------------------------------|
| 3812     | Search & Navigation Equipment         | 51,700                                      | 62,125   | 241,573                               | 50                                  |
| 3821     | Laboratory Apparatus & Furniture      | 5   | 127,912  | 237,330                               | 0                                   |
| 3822     | Environmental Controls                | 305,355                                     | 4,017,440  | 4,897,977                             | 0                                   |
| 3823     | Process Control Instruments           | 24,060                                      | 554,486  | 651,260                               | 0                                   |
| 3824     | Fluid Meters & Counting Devices       | 44,229                                      | 367,834  | 454,026                               | 0                                   |
| 3825     | Instruments to Measure Electricity    | 27,471                                      | 74,161   | 247,194                               | 0                                   |
| 3826     | Analytical Instruments                | 0   | 42,200   | 53,850                                | 0                                   |
| 3827     | Optical Instruments & Lenses          | 30,372                                      | 93,179   | 611,557                               | 0                                   |
| 3829     | Measuring & Controlling Devices, nec* | 24,448                                      | 81,099   | 251,487                               | 0                                   |
| 3841     | Surgical & Medical Instruments        | 3,618,136                                   | 1,836,875  | 7,282,007                             | 52                                  |
| 3842     | Surgical Appliances & Supplies        | 1,139,608                                   | 1,150,352  | 2,748,064                             | 410                                 |
| 3843     | Dental Equipment & Supplies           | 1,385                                       | 131,101  | 160,550                               | 0                                   |
| 3844     | X-ray Apparatus & Tubes               | 20,260                                      | 180,345  | 239,202                               | 0                                   |
| 3845     | Electromedical Equipment              | 21,000                                      | 94,422   | 142,412                               | 0                                   |
| 3851     | Ophthalmic Goods                      | 225,056                                     | 519,000  | 1,190,177                             | 1                                   |
| 3861     | Photographic Equipment & Supplies     | 36,679,953                                  | 8,007,796  | 55,406,391                            | 140,696                             |
| 3873     | Watches, Clocks, Watchcases & Parts   | 26,126                                      | 5,650  | 58,400                                | 0                                   |
|          | Multiple within SIC Code 38           | 305,508                                     | 722,127  | 1,604,055                             | 350                                 |
|          | Total for SIC Code 38                 | 42,544,672                                  | 18,068,104   | 76,477,512                            | 141,559                             |

**Note:** **On-site Releases** from Section 5 of Form R. **On-site Waste Management** from Section 8 of Form R. **Off-site Releases** from Section 6 (transfers off-site to disposal) of Form R. **Total Transfers Off-site for Further Waste Management** from Section 6 (excluding transfers off-site to disposal) of Form R. **Total Production-related Waste** sums Section 8 (Current Year, Column B) of Form R, except: **Non-production-related Waste** (remedial/catastrophic incidents). Facilities/forms with more than one 4-digit SIC code within SIC code 38 are assigned to the "multiple" category. There may be forms but no facilities in a single 4-digit SIC code because a facility reported different 4-digit SIC codes in SIC code 38 on its individual forms.

\*nec: not elsewhere classified.

pound total. The industry reported 8.0 million pounds of transfers off-site for further waste management, which was 44.3% of the sector's total of 18.1 million pounds in that category. The photographic equipment industry accounted for 55.4 million pounds of total production-related waste, 72.4% of the sector total of 76.5 million pounds.

The optical instruments and lenses industry (SIC code 3827) ranked first in this sector for off-site releases, with 425,000 pounds, 50.1% of the sector's total of 849,000 pounds. In this category, the photographic equipment industry (SIC code 3861) ranked second, with 189,000 pounds (22.3%).

The surgical and medical instruments industry (SIC code 3841) ranked second among instruments and

photographic equipment industries in most other categories summarized in Table 15-1. This industry reported 1.6 million pounds of on-site releases (11.0% of the sector's total), 1.7 million pounds of total releases (10.8%), 3.6 million pounds of other on-site waste management (8.5%), and 7.3 million pounds of total production-related waste (9.5%). The environmental controls industry (SIC code 3822) ranked second with 4.0 million pounds (22.2%) of transfers off-site for further waste management.

The surgical and medical instruments industry (SIC code 3841) ranked third in this sector for both off-site releases (70,000 pounds, or 8.3%) and transfers off-site for further waste management (1.8 million pounds, or 10.2%).



## Chapter 15 — TRI Data for Instruments and Photographic Equipment

Forms reporting multiple SIC codes in SIC code 38 (explained below) reported the sector's third largest amount of on-site releases, with 549,000 pounds (3.8%), and total releases, with 556,000 pounds (3.6%). The surgical appliances industry (SIC code 3842) ranked third for other on-site waste management, with 1.1 million pounds (2.7%), and the environmental controls industry (SIC code 3822) ranked third for total production-related waste, with 4.9 million pounds (6.4%).

### Multiple SIC Codes in SIC Code 38

Some facilities in the instruments and photographic equipment sector manufacture distinct, but related, products that are classified in separate SIC codes within SIC code 38. A facility may manufacture both process control instruments for industry (SIC code 3823) and instruments to measure electricity (SIC code 3825). Another facility may produce both analytical instruments for laboratory use (SIC code 3826) and miscellaneous measuring and controlling devices (SIC code 3829). These facilities may report multiple SIC codes on their TRI forms. (Box 1-5 in Chapter 1 further explains reporting of multiple SIC codes and its affect on the analyses presented in the TRI data release.)

Table 15-2 further examines reporting on the 40 forms that reported multiple SIC codes in SIC code 38 in 1996. The surgical and medical instruments industry (SIC code 3841) appeared in the two combinations that were most frequently reported. This industry and the surgical appliances industry (SIC code 3842) was the most frequent combination, on 19 forms. Surgical and medical instruments and electromedical equipment (SIC code 3845) was the second most frequent combination, on 6 forms. Altogether, the multiple-codes forms in SIC code 38 reported 556,000 pounds of total on- and off-site releases and 1.6 million pounds of total production-related waste in 1996.

### On- and Off-site Releases

The instruments and photographic equipment sector reported 13.2 million pounds of air emissions in 1996, amounting to 86.0% of all releases reported in this sector. Surface water discharges were the second-largest release type, with 1.3 million pounds (8.5%). Off-site releases (transfers to disposal) totaled 849,000 pounds (5.5%). The sector reported less than 3,000 pounds of other on-site land releases and no underground injection. Table 15-3 presents the sector's on- and off-site releases for

**Table 15-2. Multiple SIC Codes, 1996: Instruments and Photographic Equipment, SIC Code 38**

| SIC Codes             |      | Total Forms Number | Form As Number | Total On-site Releases Pounds | Total Off-site Releases Pounds | Total On- and Off-site Releases Pounds | Total Other On-site Waste Management Pounds | Total Transfers Off-site for Further Waste Management Pounds | Total Production-related Waste Pounds | Non-Production-related Waste Pounds |
|-----------------------|------|--------------------|----------------|-------------------------------|--------------------------------|--|---|--|---------------------------------------|-------------------------------------|
| 3823                  | 3824 | 1                  | 1              | 0                             | 0                              | 0                                      | 0   | 0  | 0                                     | 0                                   |
| 3823                  | 3825 | 4                  | 1              | 50                            | 0                              | 50                                     | 9,020                                       | 22,548   | 53,675                                | 0                                   |
| 3823                  | 3825 | 1                  | 0              | 10,024                        | 0                              | 10,024                                 | 0   | 0  | 10,024                                | 0                                   |
| 3823                  | 3829 | 4                  | 0              | 18,340                        | 1,035                          | 19,375                                 | 13,560                                      | 86,305   | 117,736                               | 0                                   |
| 3826                  | 3827 | 1                  | 0              | 10                            | 0                              | 10                                     | 0   | 0  | 8                                     | 0                                   |
| 3826                  | 3829 | 4                  | 0              | 20,343                        | 0                              | 20,343                                 | 8,486                                       | 86,399   | 114,449                               | 0                                   |
| 3841                  | 3842 | 19                 | 0              | 424,621                       | 5,300                          | 429,921                                | 138,442                                     | 480,152  | 1,049,425                             | 350                                 |
| 3841                  | 3845 | 6                  | 0              | 76,015                        | 0                              | 76,015                                 | 136,000                                     | 46,723   | 258,738                               | 0                                   |
| Total for SIC Code 38 |      | 40                 | 2              | 549,403                       | 6,335                          | 555,738                                | 305,508                                     | 722,127  | 1,604,055                             | 350                                 |

**Note:** **On-site Releases** from Section 5 of Form R. **On-site Waste Management** from Section 8 of Form R. **Off-site Releases** are transfers off-site to disposal from Section 6 of Form R. **Total Transfers Off-site for Further Waste Management** from Section 6 of Form R. **Total Production-related Waste** sums Section 8 of Form R, except: **Non-production-related Waste** (remedial/catastrophic incidents).


**Table 15-3. TRI On-site and Off-site Releases, 1996: Instruments and Photographic Equipment, SIC Code 38**

| SIC Code | Industry                              | Total Air Emissions Pounds | Surface Water Discharges Pounds | Underground Injection |                         | On-site Land Releases            |                                    | Total On-site Releases Pounds | Off-site Releases                     | Total On- and Off-site Releases Pounds |
|----------|---------------------------------------|----------------------------|---------------------------------|-----------------------|-------------------------|----------------------------------|------------------------------------|-------------------------------|---------------------------------------|--|
|          |                                       |                            |                                 | Class I Wells Pounds  | Class II-V Wells Pounds | RCRA Subtitle C Landfills Pounds | Other On-site Land Releases Pounds |                               | Transfers Off-site to Disposal Pounds |  |
| 3861     | Photographic Equipment & Supplies     | 9,109,603                  | 1,296,335                       | 0                     | 0                       | 0                                | 1,150                              | 10,407,088                    | 189,101                               | 10,596,189                             |
| 3841     | Surgical & Medical Instruments        | 1,594,204                  | 6                               | 0                     | 0                       | 0                                | 260                                | 1,594,470                     | 70,351                                | 1,664,821                              |
|          | Multiple within SIC Code 38           | 549,123                    | 280                             | 0                     | 0                       | 0                                | 0                                  | 549,403                       | 6,335                                 | 555,738                                |
| 3822     | Environmental Controls                | 437,011                    | 60                              | 0                     | 0                       | 0                                | 1,042                              | 438,113                       | 66,290                                | 504,403                                |
| 3827     | Optical Instruments & Lenses          | 54,439                     | 810                             | 0                     | 0                       | 0                                | 0                                  | 55,249                        | 425,442                               | 480,691                                |
| 3842     | Surgical Appliances & Supplies        | 462,966                    | 0                               | 0                     | 0                       | 0                                | 0                                  | 462,966                       | 13,061                                | 476,027                                |
| 3851     | Ophthalmic Goods                      | 395,622                    | 0                               | 0                     | 0                       | 0                                | 0                                  | 395,622                       | 48,258                                | 443,880                                |
| 3829     | Measuring & Controlling Devices, nec* | 146,866                    | 0                               | 0                     | 0                       | 0                                | 0                                  | 146,866                       | 0                                     | 146,866                                |
| 3812     | Search & Navigation Equipment         | 125,441                    | 0                               | 0                     | 0                       | 0                                | 0                                  | 125,441                       | 4,000                                 | 129,441                                |
| 3821     | Laboratory Apparatus & Furniture      | 99,179                     | 5                               | 0                     | 0                       | 0                                | 0                                  | 99,184                        | 265                                   | 99,449                                 |
| 3823     | Process Control Instruments           | 74,607                     | 17                              | 0                     | 0                       | 0                                | 79                                 | 74,703                        | 0                                     | 74,703                                 |
| 3844     | X-ray Apparatus & Tubes               | 26,919                     | 23                              | 0                     | 0                       | 0                                | 0                                  | 26,942                        | 11,910                                | 38,852                                 |
| 3843     | Dental Equipment & Supplies           | 31,275                     | 0                               | 0                     | 0                       | 0                                | 0                                  | 31,275                        | 5,450                                 | 36,725                                 |
| 3824     | Fluid Meters & Counting Devices       | 34,808                     | 25                              | 0                     | 0                       | 0                                | 0                                  | 34,833                        | 1,005                                 | 35,838                                 |
| 3845     | Electromedical Equipment              | 20,692                     | 0                               | 0                     | 0                       | 0                                | 0                                  | 20,692                        | 7,100                                 | 27,792                                 |
| 3873     | Watches, Clocks, Watchcases & Parts   | 26,500                     | 0                               | 0                     | 0                       | 0                                | 0                                  | 26,500                        | 0                                     | 26,500                                 |
| 3826     | Analytical Instruments                | 11,000                     | 0                               | 0                     | 0                       | 0                                | 0                                  | 11,000                        | 0                                     | 11,000                                 |
| 3825     | Instruments to Measure Electricity    | 1,156                      | 0                               | 0                     | 0                       | 0                                | 0                                  | 1,156                         | 0                                     | 1,156                                  |
|          | Total for SIC Code 38                 | 13,201,411                 | 1,297,561                       | 0                     | 0                       | 0                                | 2,531                              | 14,501,503                    | 848,568                               | 15,350,071                             |

**Note:** On-site Releases from Section 5 of Form R. Off-site Releases from Section 6 (off-site transfers to disposal) of Form R. Forms with more than one 4-digit SIC code within SIC code 38 are assigned to the "multiple" category.

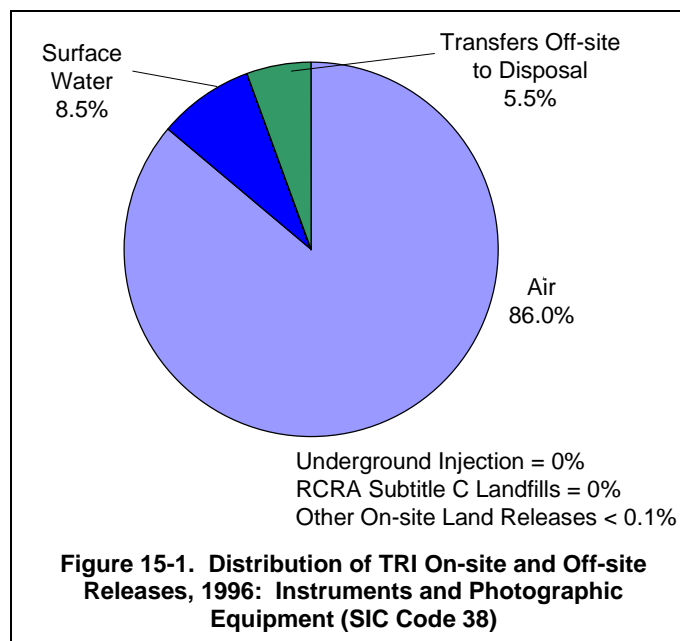
\*nec: not elsewhere classified.

1996, and Figure 15-1 illustrates their distribution by release type.

The photographic equipment industry (SIC code 3861) reported the sector's largest amounts of on-site releases. This industry reported releasing 9.1 million pounds to air and 1.3 million pounds to surface water. One facility in SIC code 3861 reported air emissions of 2.4 million pounds of dichloromethane, 1.4 million pounds of methanol, and 2.0 million pounds of hydrochloric acid in 1996. These were the three top chemicals for releases by this sector in 1996, as seen in the discussion of "1996 TRI Data by Chemical," below. The same facility and another facility owned by the same parent company reported a total of 940,000 pounds of surface water discharges of nitrate compounds.

The surgical and medical instruments industry (SIC code 3841) ranked second in this sector for air emissions, with 1.6 million pounds. No industry in this sector, other than the photographic equipment industry (SIC code 3861), reported more than 1,000 pounds of surface water discharges. The

photographic equipment industry and the environmental controls industry (SIC code 3822) each reported approximately 1,000 pounds of other on-site land releases.



**Note:** On-site Releases from Section 5 of Form R. Off-site Releases from Section 6 (transfers off-site to disposal) of Form R.



The optical instruments and lenses industry (SIC code 3827) ranked first in this sector for off-site releases, reporting 425,000 pounds, followed by photographic equipment (SIC code 3861) with 189,000 pounds. One optical instruments and lenses facility reported transfers to disposal of 212,000 of barium, and another facility in this industry reported transfers to disposal of 160,000 pounds of zinc compounds.

Figure 15-2 shows the distribution of on- and off-site releases for the industries (four-digit SIC code) with the sector's largest releases.

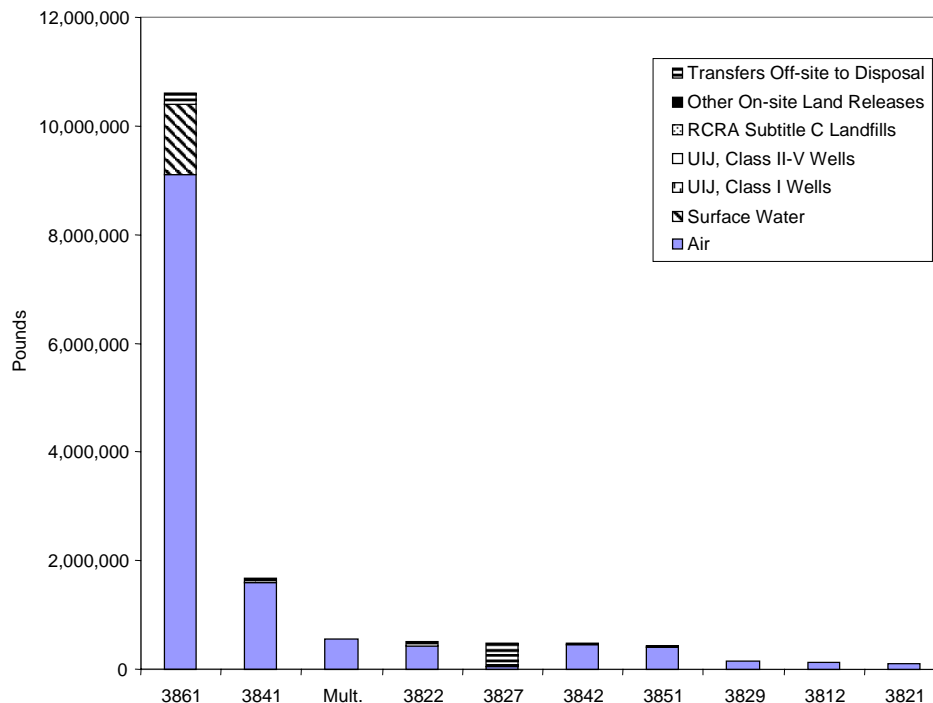
### Other On-site Waste Management

The instruments and photographic equipment sector reported on-site treatment totaling 37.6 million pounds in 1996, as shown in Table 15-4. On-site treatment amounted to 88.5% of the sector's total other on-site waste management. The sector

reported 4.0 million pounds of on-site recycling and 939,000 pounds of on-site energy recovery. These amounts represented 9.3% and 2.2%, respectively, of the sector's total other on-site waste management.

The photographic equipment industry (SIC code 3861) reported the largest amounts in all three types of on-site waste management. This industry reported on-site treatment of 33.4 million pounds, including 14.0 million pounds of methanol reported by one facility. This one form for methanol represented one-third (32.9%) of the sector's total other on-site waste management in 1996. The surgical and medical instruments industry (SIC code 3841) ranked second in the sector for on-site treatment, with 2.9 million pounds.

The photographic equipment industry (SIC code 3861) reported 2.6 million pounds of on-site recycling and 684,000 pounds of on-site energy



**Figure 15-2. TRI On-site and Off-site Releases, SIC Codes with Largest Releases, 1996: Instruments and Photographic Equipment (SIC Code 38)**

**Note:** On-site Releases from Section 5 of Form R. Off-site Releases from Section 6 (transfers off-site to disposal). UIJ = underground injection. Forms with more than one 4-digit SIC code within SIC code 38 are assigned to the "multiple" category.





**Table 15-4. TRI Other On-site Waste Management, 1996: Instruments and Photographic Equipment, SIC Code 38 (in Rank Order)**

| SIC Code | Industry                              | Recycled On-site Pounds | Energy Recovery On-site Pounds | Treated On-site Pounds | Total Other On-site Waste Management Pounds |
|----------|---------------------------------------|-------------------------|--------------------------------|------------------------|---|
| 3861     | Photographic Equipment & Supplies     | 2,645,308               | 683,500                        | 33,351,145             | 36,679,953                                  |
| 3841     | Surgical & Medical Instruments        | 678,671                 | 0                              | 2,939,465              | 3,618,136                                   |
| 3842     | Surgical Appliances & Supplies        | 242,106                 | 0                              | 897,502                | 1,139,608                                   |
|          | Multiple within SIC Code 38           | 13,560                  | 0                              | 291,948                | 305,508                                     |
| 3822     | Environmental Controls                | 44,905                  | 255,185                        | 5,265                  | 305,355                                     |
| 3851     | Ophthalmic Goods                      | 220,186                 | 0                              | 4,870                  | 225,056                                     |
| 3812     | Search & Navigation Equipment         | 47,900                  | 0                              | 3,800                  | 51,700                                      |
| 3824     | Fluid Meters & Counting Devices       | 0                       | 0                              | 44,229                 | 44,229                                      |
| 3827     | Optical Instruments & Lenses          | 30,372                  | 0                              | 0                      | 30,372                                      |
| 3825     | Instruments to Measure Electricity    | 0                       | 0                              | 27,471                 | 27,471                                      |
| 3873     | Watches, Clocks, Watchcases & Parts   | 11,100                  | 0                              | 15,026                 | 26,126                                      |
| 3829     | Measuring & Controlling Devices, nec* | 24,448                  | 0                              | 0                      | 24,448                                      |
| 3823     | Process Control Instruments           | 0                       | 0                              | 24,060                 | 24,060                                      |
| 3845     | Electromedical Equipment              | 0                       | 0                              | 21,000                 | 21,000                                      |
| 3844     | X-ray Apparatus & Tubes               | 2,179                   | 0                              | 18,081                 | 20,260                                      |
| 3843     | Dental Equipment & Supplies           | 0                       | 0                              | 1,385                  | 1,385                                       |
| 3821     | Laboratory Apparatus & Furniture      | 0                       | 0                              | 5                      | 5   |
| 3826     | Analytical Instruments                | 0                       | 0                              | 0                      | 0   |
|          | Total for SIC Code 38                 | 3,960,735               | 938,685                        | 37,645,252             | 42,544,672                                  |

**Note:** Other On-site Waste Management from Section 8 of Form R. Forms with more than one 4-digit SIC code within SIC code 38 are assigned to the "multiple" category.

\*nec: not elsewhere classified.

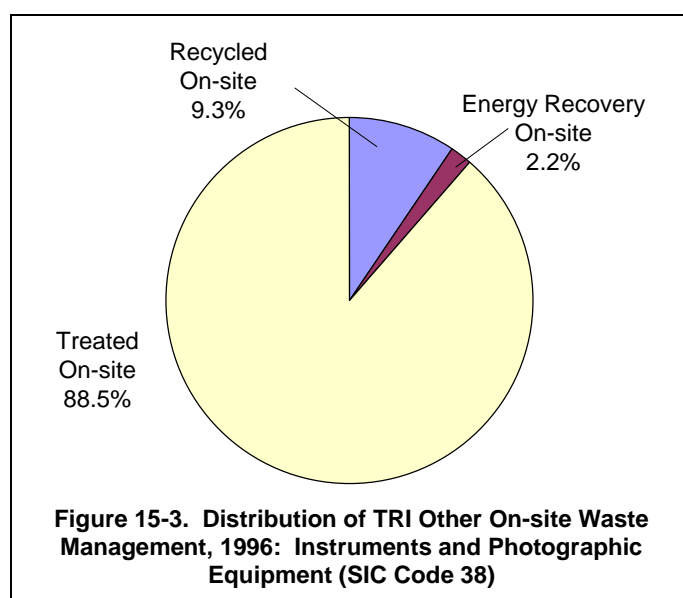
recovery. The surgical and medical instruments industry (SIC code 3841) ranked second for on-site recycling with 679,000 pounds. Only one industry in this sector, besides photographic equipment, reported on-site energy recovery. This was the environmental controls industry (SIC code 3822) with 255,000 pounds.

Figure 15-3 illustrates the percentage distribution of on-site waste management types reported by the instruments and photographic equipment sector in 1996. Figure 15-4 illustrates the distribution of on-site waste management reporting for the top industries in this sector.

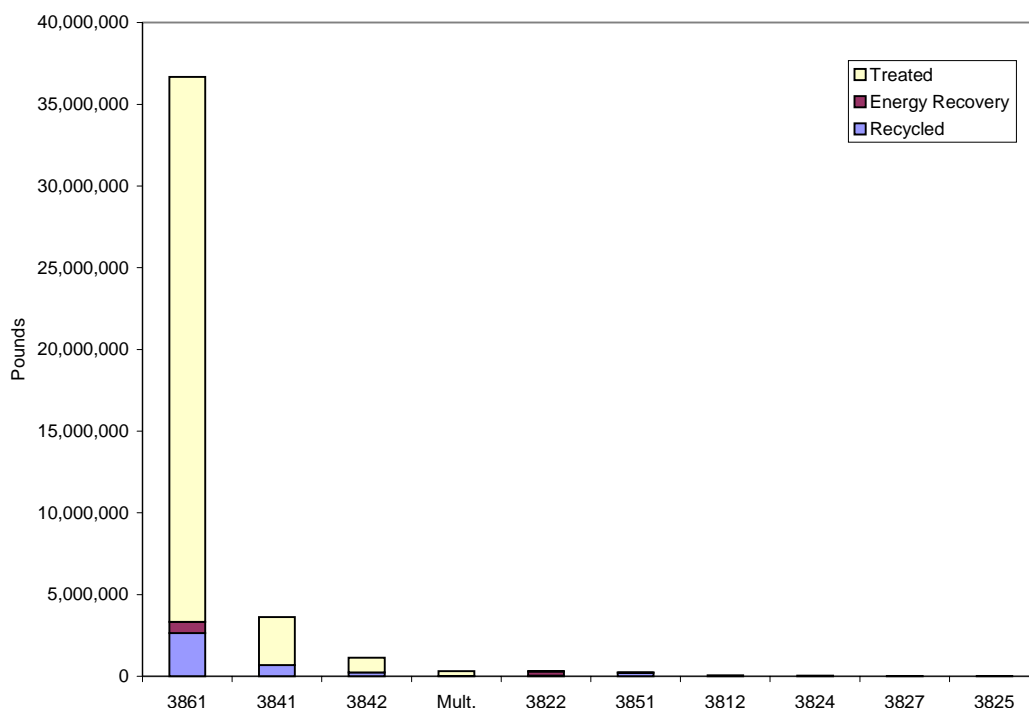
## Transfers Off-site for Further Waste Management

Two-thirds (67.8%) of the instruments and photographic equipment sector's 1996 reporting of transfers off-site for further waste management consisted of transfers to recycling, which totaled 12.2 million pounds. The sector reported 2.4 million pounds of transfers to energy recovery

(13.1% of total transfers off-site for further waste management), 2.5 million pounds of transfers to treatment (13.7%), and 931,000 pounds of transfers to POTWs (5.2%). Table 15-5 presents these data and Figure 15-5 illustrates the percentage distribution.



**Note:** Data from Section 8 of Form R.



**Figure 15-4. TRI Other On-site Waste Management, SIC Codes with Largest Totals, 1996: Instruments and Photographic Equipment (SIC Code 38)**

**Note:** Other On-site Waste Management from Section 8 of Form R. Forms with more than one 4-digit SIC code within SIC Code 38 are assigned to the “multiple” category.

The environmental controls industry (SIC code 3822) ranked first among instruments and photographic equipment industries for transfers to recycling, with 4.0 million pounds. This included 2.8 million pounds of copper. Two environmental controls facilities, owned by the same parent company, reported transferring a total of 1.3 million pounds of copper to recycling. The photographic equipment industry (SIC code 3861) ranked second for transfers to recycling, with 3.6 million pounds, including 2.2 million pounds of dichloromethane. Three unrelated facilities in this industry reported almost all of this industry’s transfers of dichloromethane to recycling.

The photographic equipment industry (SIC code 3861) reported transfers of 2.0 million pounds to energy recovery and 2.1 million pounds to treatment. These were the sector’s largest amounts in the two transfer types. No other industry in this sector reported as much as 125,000 pounds in either

category. The photographic equipment industry also reported the sector’s largest transfers to POTWs, with 381,000 pounds, followed by surgical and medical instruments (SIC code 3841), with 209,000 pounds.

Figure 15-6 illustrates the distribution of off-site transfers for further waste management for the top industries in this sector.

## 1996 TRI Data by State for Instruments and Photographic Equipment

As shown in Table 15-6, the instruments and photographic equipment sector submitted 112 forms in New York in 1996, more than twice as many as in any other state. Massachusetts ranked second with 49 forms. There were 43 forms in both

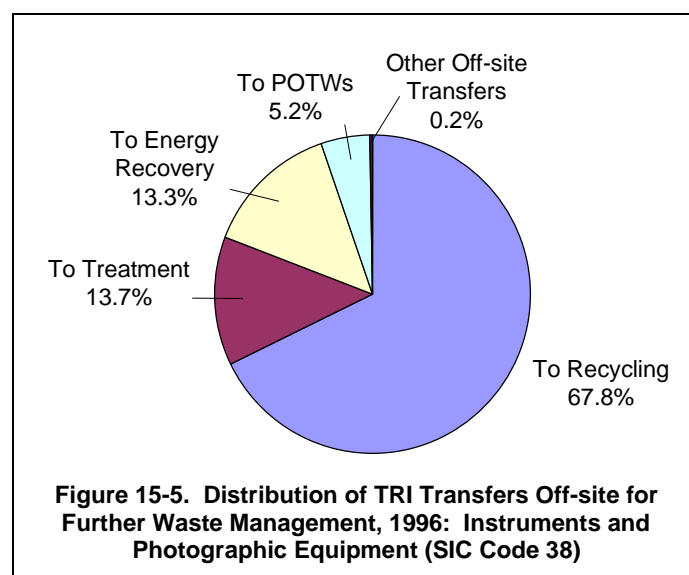


**Table 15-5. TRI Transfers Off-site for Further Waste Management, 1996: Instruments and Photographic Equipment, SIC Code 38 (in Rank Order)**

| SIC Code              | Industry                              | Transfers to Recycling Pounds | Transfers to Energy Recovery Pounds | Transfers to Treatment Pounds | Transfers to POTWs Pounds | Other Off-site Transfers Pounds | Total Off-site Transfers for Further Waste Management Pounds |
|-----------------------|---------------------------------------|-------------------------------|-------------------------------------|-------------------------------|---------------------------|---------------------------------|--|
| 3861                  | Photographic Equipment & Supplies     | 3,550,526                     | 2,009,344                           | 2,067,207                     | 380,719                   | 0                               | 8,007,796  |
| 3822                  | Environmental Controls                | 3,964,314                     | 4,506                               | 47,551                        | 1,069                     | 0                               | 4,017,440  |
| 3841                  | Surgical & Medical Instruments        | 1,427,241                     | 71,149                              | 84,899                        | 208,998                   | 44,588                          | 1,836,875  |
| 3842                  | Surgical Appliances & Supplies        | 926,136                       | 0                                   | 34,460                        | 189,756                   | 0                               | 1,150,352  |
|                       | Multiple within SIC Code 38           | 583,595                       | 26,108                              | 71,564                        | 40,860                    | 0                               | 722,127  |
| 3823                  | Process Control Instruments           | 550,370                       | 4,101                               | 0                             | 15                        | 0                               | 554,486  |
| 3851                  | Ophthalmic Goods                      | 319,856                       | 110,767                             | 66,540                        | 21,837                    | 0                               | 519,000  |
| 3824                  | Fluid Meters & Counting Devices       | 359,551                       | 0                                   | 7,924                         | 359                       | 0                               | 367,834  |
| 3844                  | X-ray Apparatus & Tubes               | 176,956                       | 0                                   | 3,369                         | 20                        | 0                               | 180,345  |
| 3843                  | Dental Equipment & Supplies           | 101,451                       | 4,650                               | 0                             | 25,000                    | 0                               | 131,101  |
| 3821                  | Laboratory Apparatus & Furniture      | 44,938                        | 67,349                              | 1,545                         | 14,080                    | 0                               | 127,912  |
| 3845                  | Electromedical Equipment              | 91,782                        | 1,920                               | 720                           | 0                         | 0                               | 94,422   |
| 3827                  | Optical Instruments & Lenses          | 12,496                        | 20,683                              | 59,750                        | 250                       | 0                               | 93,179   |
| 3829                  | Measuring & Controlling Devices, nec* | 72,226                        | 8,804                               | 58                            | 11                        | 0                               | 81,099   |
| 3825                  | Instruments to Measure Electricity    | 31,475                        | 14,760                              | 254                           | 27,672                    | 0                               | 74,161   |
| 3812                  | Search & Navigation Equipment         | 32,755                        | 0                                   | 29,120                        | 250                       | 0                               | 62,125   |
| 3826                  | Analytical Instruments                | 0                             | 22,200                              | 0                             | 20,000                    | 0                               | 42,200   |
| 3873                  | Watches, Clocks, Watchcases & Parts   | 250                           | 0                                   | 5,400                         | 0                         | 0                               | 5,650  |
| Total for SIC Code 38 |                                       | 12,245,918                    | 2,366,341                           | 2,480,361                     | 930,896                   | 44,588                          | 18,068,104   |

**Note: Off-site Transfers for Further Waste Management** from Section 6 (excluding off-site transfers to disposal) of Form R. Other Off-site Transfers are transfers reported without a valid waste management code. Forms with more than one 4-digit SIC code within SIC code 38 are assigned to the “multiple” category.

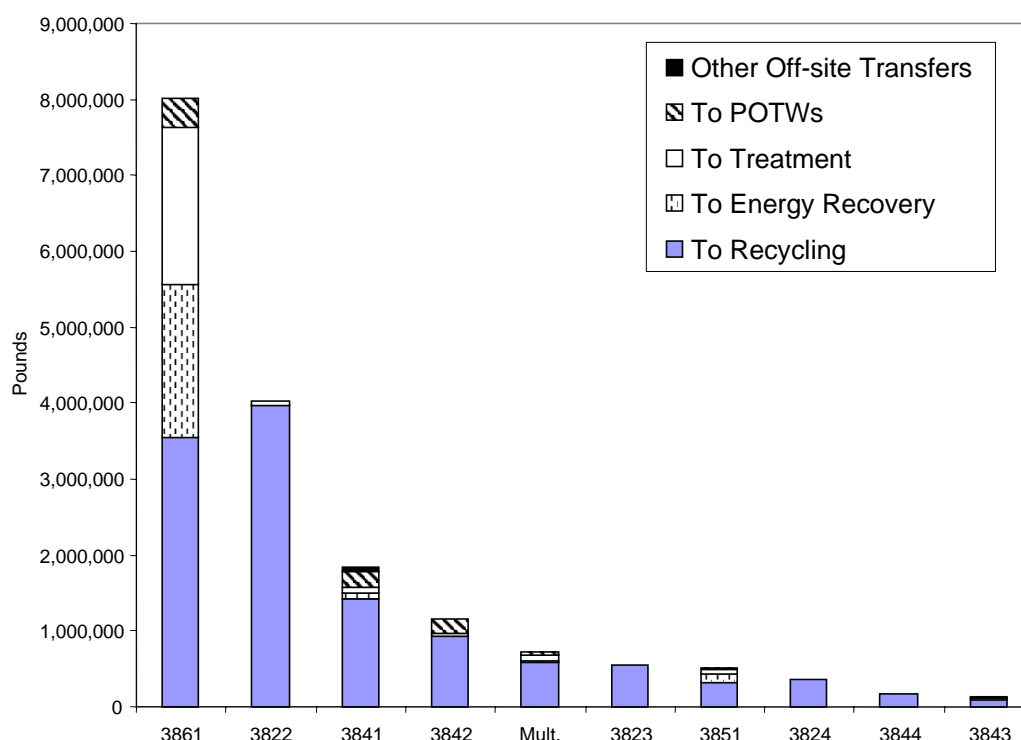
\*nec: not elsewhere classified.



**Note: Transfers Off-site for Further Waste Management** from Section 6 (excluding transfers off-site to disposal) of Form R. Other Off-site Transfers are transfers reported without a valid waste management code.

California and Illinois. These amounts represented 15.8% of the sector’s forms in New York, 6.9% in Massachusetts, and 6.1% each in California and Illinois.

New York ranked first in this sector for on-site releases (7.68 million pounds), total on- and off-site releases (7.70 million pounds), other on-site waste management (27.4 million pounds), and total production-related waste (36.2 million pounds). Half or more of the sector’s totals in these categories was reported in New York, including 64.4% of the total other on-site waste management. The photographic equipment facility (in SIC code 3861) that reported the majority of that industry’s releases and on-site waste management, as discussed earlier in this chapter, is located in New York.



**Figure 15-6. TRI Transfers Off-site for Further Waste Management, SIC Codes with Largest Totals, 1996: Instruments and Photographic Equipment (SIC Code 38)**

**Note: Off-site Transfers for Further Waste Management** from Section 6 (excluding off-site transfers to disposal) of Form R. Other Off-site Transfers are transfers reported without a valid waste management code. Forms with more than one 4-digit SIC code within SIC code 38 are assigned to the "multiple" category.

Pennsylvania ranked second for on-site releases and total on- and off-site releases, followed by Colorado in both categories. The sector reported 826,000 pounds of total releases in Pennsylvania, 5.4% of the sector's total, and 743,000 pounds in Colorado, 4.8% of the total. The large majority of the releases in Pennsylvania and all of the releases in Colorado were reported as on-site releases.

For other on-site waste management and for total production-related waste, Massachusetts and Pennsylvania ranked second and third, after New York. The sector reported 4.2 million pounds of other on-site waste management in Massachusetts, which was 9.9% of the sector's total. In Pennsylvania, the sector reported 1.6 million pounds, 3.8% of the total.

The two categories not led by New York were off-site releases and transfers off-site for further waste management. The instruments and photographic equipment sector reported 217,000 pounds of off-site releases in Ohio and 214,000 pounds in Louisiana. These amounts were approximately 25% each of the sector's total off-site releases. South Carolina ranked third with 122,000 pounds (14.4%). Massachusetts ranked first for transfers off-site for further waste management in this sector, reporting 3.4 million pounds (19.0%). Ohio ranked second with 1.4 million pounds (7.9%), and Pennsylvania ranked third with 1.3 million pounds (7.3%).

Map 15-1 illustrates the geographic distribution of total on- and off-site releases in the instruments and photographic equipment sector.

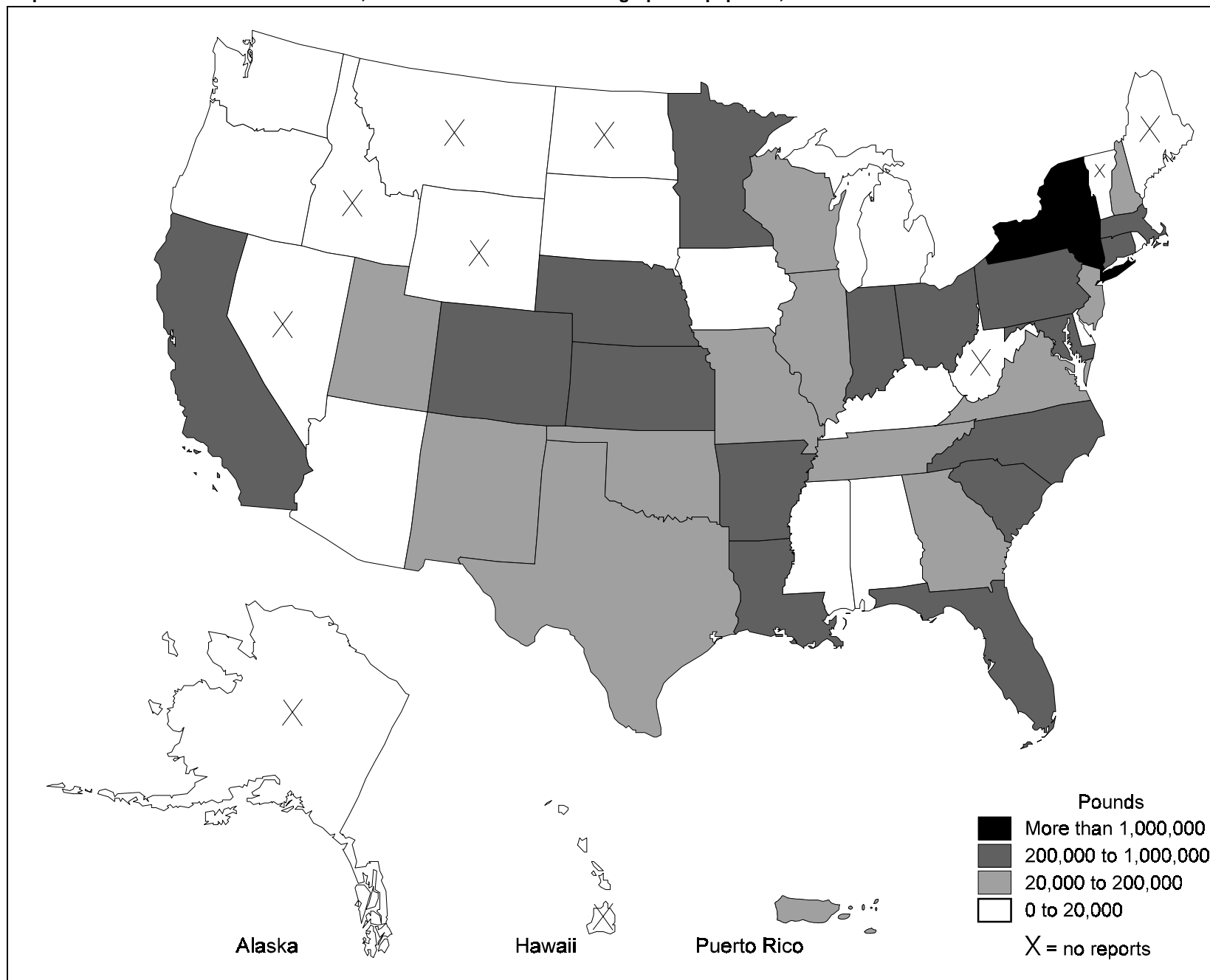


Table 15-6. Summary of TRI Information by State, 1996: Instruments and Photographic Equipment, SIC Code 38

| State                 | Total<br>Facilities<br>Number | Total<br>Forms<br>Number | Form As<br>Number | Total<br>On-site<br>Releases<br>Pounds | Total<br>Off-site<br>Releases<br>Pounds | Total<br>On- and<br>Off-site<br>Releases<br>Pounds | Total Other<br>On-site<br>Waste<br>Management<br>Pounds | Total Transfers<br>Off-site for<br>Further Waste<br>Management<br>Pounds | Total<br>Production-<br>related<br>Waste<br>Pounds | Non-<br>Production-<br>related<br>Waste<br>Pounds |
|-----------------------|-------------------------------|--------------------------|-------------------|--|---|--|---|--|--|---|
| Alabama               | 1                             | 5                        | 0                 | 540                                    | 1,005                                   | 1,545  | 0   | 0  | 359  | 0   |
| Arizona               | 1                             | 2                        | 0                 | 7,200                                  | 0                                       | 7,200  | 238,300   | 120,600  | 361,500  | 0   |
| Arkansas              | 6                             | 16                       | 0                 | 250,293                                | 5,951                                   | 256,244  | 15,026  | 452,440  | 720,558  | 0   |
| California            | 29                            | 43                       | 4                 | 211,992                                | 60,562                                  | 272,554  | 42,798  | 790,251  | 1,109,179  | 0   |
| Colorado              | 8                             | 29                       | 5                 | 742,567                                | 0                                       | 742,567  | 1,575,900   | 790,730  | 3,014,185  | 1   |
| Connecticut           | 8                             | 16                       | 0                 | 324,614                                | 1,035                                   | 325,649  | 82,060  | 351,268  | 757,442  | 350   |
| Delaware              | 2                             | 4                        | 0                 | 526                                    | 0                                       | 526  | 0   | 17,000   | 17,526   | 0   |
| Florida               | 10                            | 22                       | 1                 | 387,102                                | 4,500                                   | 391,602  | 345,550   | 231,998  | 971,467  | 1   |
| Georgia               | 9                             | 15                       | 1                 | 78,330                                 | 65,848                                  | 144,178  | 313,100   | 245,449  | 652,936  | 52  |
| Illinois              | 20                            | 43                       | 8                 | 49,416                                 | 3,766                                   | 53,182   | 372,011   | 752,997  | 1,163,663  | 0   |
| Indiana               | 8                             | 30                       | 3                 | 681,075                                | 927                                     | 682,002  | 1,359,932   | 430,013  | 2,567,928  | 0   |
| Iowa                  | 1                             | 1                        | 0                 | 0                                      | 0                                       | 0  | 0   | 10,200   | 10,200   | 0   |
| Kansas                | 2                             | 4                        | 0                 | 265,957                                | 0                                       | 265,957  | 0   | 148,060  | 405,762  | 0   |
| Kentucky              | 1                             | 1                        | 0                 | 0                                      | 0                                       | 0  | 0   | 186,236  | 186,236  | 0   |
| Louisiana             | 1                             | 3                        | 1                 | 982                                    | 213,600                                 | 214,582  | 0   | 51,000   | 265,000  | 0   |
| Maryland              | 3                             | 6                        | 0                 | 185,616                                | 48,263                                  | 233,879  | 16,059  | 62,478   | 298,418  | 0   |
| Massachusetts         | 22                            | 49                       | 1                 | 486,210                                | 25,700                                  | 511,910  | 4,206,863   | 3,431,062  | 8,176,996  | 15  |
| Michigan              | 4                             | 10                       | 0                 | 1,025                                  | 3,200                                   | 4,225  | 124,800   | 36,011   | 163,540  | 0   |
| Minnesota             | 12                            | 28                       | 0                 | 416,786                                | 1,000                                   | 417,786  | 63,867  | 747,620  | 1,229,398  | 0   |
| Mississippi           | 1                             | 2                        | 0                 | 18,095                                 | 0                                       | 18,095   | 0   | 0  | 26,290   | 0   |
| Missouri              | 9                             | 18                       | 1                 | 88,245                                 | 500                                     | 88,745   | 26,200  | 935,246  | 1,123,796  | 0   |
| Nebraska              | 4                             | 18                       | 0                 | 342,614                                | 10,214                                  | 352,828  | 356,270   | 158,066  | 1,113,161  | 0   |
| New Hampshire         | 3                             | 8                        | 0                 | 23,006                                 | 0                                       | 23,006   | 205,341   | 156,112  | 384,459  | 0   |
| New Jersey            | 14                            | 33                       | 4                 | 139,888                                | 20,558                                  | 160,446  | 351,751   | 570,192  | 1,075,513  | 50  |
| New Mexico            | 1                             | 1                        | 0                 | 20,387                                 | 0                                       | 20,387   | 23,872  | 3,485  | 47,744   | 0   |
| New York              | 22                            | 112                      | 5                 | 7,675,288                              | 26,636                                  | 7,701,924  | 27,399,425  | 1,006,908  | 36,186,024   | 10,030  |
| North Carolina        | 10                            | 30                       | 4                 | 342,197                                | 0                                       | 342,197  | 198,836   | 446,392  | 1,138,102  | 650   |
| Ohio                  | 14                            | 23                       | 2                 | 69,071                                 | 217,363                                 | 286,434  | 316,768   | 1,426,915  | 2,036,278  | 393   |
| Oklahoma              | 4                             | 12                       | 0                 | 65,052                                 | 0                                       | 65,052   | 1,332,883   | 1,204,012  | 2,741,216  | 0   |
| Oregon                | 1                             | 1                        | 0                 | 250                                    | 0                                       | 250  | 0   | 31,470   | 32,260   | 0   |
| Pennsylvania          | 12                            | 22                       | 2                 | 825,346                                | 1,100                                   | 826,446  | 1,618,849   | 1,323,057  | 3,639,163  | 130,000   |
| Puerto Rico           | 8                             | 14                       | 0                 | 115,805                                | 5                                       | 115,810  | 481,417   | 423,640  | 1,013,497  | 17  |
| Rhode Island          | 3                             | 5                        | 1                 | 1,158                                  | 0                                       | 1,158  | 0   | 38,212   | 38,898   | 0   |
| South Carolina        | 4                             | 11                       | 0                 | 264,437                                | 122,155                                 | 386,592  | 403,568   | 92,749   | 884,413  | 0   |
| South Dakota          | 1                             | 2                        | 0                 | 265                                    | 500                                     | 765  | 0   | 2,505  | 2,440  | 0   |
| Tennessee             | 4                             | 9                        | 0                 | 39,393                                 | 0                                       | 39,393   | 292,488   | 303,478  | 636,062  | 0   |
| Texas                 | 10                            | 18                       | 2                 | 195,582                                | 2,005                                   | 197,587  | 514,091   | 275,755  | 980,058  | 0   |
| Utah                  | 3                             | 8                        | 0                 | 117,122                                | 0                                       | 117,122  | 205,327   | 115,958  | 438,415  | 0   |
| Virginia              | 4                             | 7                        | 0                 | 36,352                                 | 0                                       | 36,352   | 52,300  | 92,660   | 188,952  | 0   |
| Washington            | 1                             | 4                        | 1                 | 50                                     | 0                                       | 50   | 9,020   | 22,548   | 53,675   | 0   |
| Wisconsin             | 10                            | 22                       | 0                 | 31,669                                 | 12,175                                  | 43,844   | 0   | 583,331  | 624,803  | 0   |
| Total for SIC Code 38 | 291                           | 707                      | 46                | 14,501,503                             | 848,568                                 | 15,350,071   | 42,544,672  | 18,068,104   | 76,477,512   | 141,559   |

**Note:** On-site Releases from Section 5 of Form R. On-site Waste Management from Section 8 of Form R. Off-site Releases from Section 6 (transfers off-site to disposal) of Form R. Total Transfers Off-site for Further Waste Management from Section 6 (excluding transfers off-site to disposal) of Form R. Total Production-related Waste sums Section 8 (Current Year, Column B) of Form R, except: Non-production-related Waste (remedial/catastrophic incidents).

Map 15-1. Total On- and Off-site Releases, 1996: Instruments and Photographic Equipment, SIC Code 38



**Note:** On-site Releases from Section 5 of Form R and Off-site Releases from Section 6 (transfers off-site to disposal) of Form R.



## 1996 TRI Data by Chemical for Instruments and Photographic Equipment

The 15 chemicals with the largest on- and off-site releases reported by the instruments and photographic equipment sector in 1996 appear in Table 15-7. Releases of these chemicals totaled 13.3 million pounds, or 86.6% of the sector's total releases in 1996. Reported air emissions of 11.7 million pounds of the top 15 chemicals amounted to 88.9% of the sector's total air emissions. The sector also reported discharging 1.1 million pounds of these chemicals to surface waters, 84.6% of the total in that category. The top 15 chemicals represented half (52.6%) of the sector's off-site releases, with 447,000 pounds.

The top three chemicals, shown on Table 15-7, were dichloromethane with 3.5 million pounds of releases, methanol with 2.4 million pounds, and hydrochloric acid with 2.0 million pounds. More than 98% of these reported releases were air emissions. As noted earlier, one facility in the photographic equipment industry (SIC code 3861) accounted for the majority of these releases. This facility reported air emissions of 2.4 million pounds of dichloromethane (69.4% of the sector's air emissions of dichloromethane), 1.4 million pounds of methanol (59.9%), and 2.0 million pounds of hydrochloric acid (100.0%).

The fourth-ranked chemical, nitrate compounds, accounted for a large majority (77.6%) of the sector's surface water discharges. Two facilities in the photographic equipment industry (SIC code 3861) reported most of the sector's surface water discharges of nitrate compounds; they are owned

**Table 15-7. The 15 Chemicals with the Largest Total On-site and Off-site Releases, 1996: Instruments and Photographic Equipment, SIC Code 38 (in Rank Order)**

| CAS Number | Chemical                                      | Total Air Emissions Pounds | Surface Water Discharges Pounds | Underground Injection |                         | On-site Land Releases            |                                    | Total On-site Releases Pounds | Off-site Releases Transfers Off-site to Disposal Pounds | Total On- and Off-site Releases Pounds |
|------------|---|----------------------------|---------------------------------|-----------------------|-------------------------|----------------------------------|------------------------------------|-------------------------------|---|--|
|            |   |                            |                                 | Class I Wells Pounds  | Class II-V Wells Pounds | RCRA Subtitle C Landfills Pounds | Other On-site Land Releases Pounds |                               |   |  |
| 75-09-2    | Dichloromethane                               | 3,488,667                  | 4,600                           | 0                     | 0                       | 0                                | 0                                  | 3,493,267                     | 1,002   | 3,494,269                              |
| 67-56-1    | Methanol                                      | 2,336,220                  | 34,716                          | 0                     | 0                       | 0                                | 0                                  | 2,370,936                     | 104   | 2,371,040                              |
| 7647-01-0  | Hydrochloric acid                             | 2,000,000                  | 0                               | 0                     | 0                       | 0                                | 0                                  | 2,000,000                     | 0   | 2,000,000                              |
| --         | Nitrate compounds                             | 84                         | 1,007,000                       | 0                     | 0                       | 0                                | 4                                  | 1,007,088                     | 0   | 1,007,088                              |
| 1717-00-6  | 1,1-Dichloro-1-fluoroethane (HCFC-141b)       | 742,616                    | 0                               | 0                     | 0                       | 0                                | 0                                  | 742,616                       | 0   | 742,616                                |
| 108-88-3   | Toluene                                       | 646,920                    | 260                             | 0                     | 0                       | 0                                | 0                                  | 647,180                       | 2   | 647,182                                |
| 78-93-3    | Methyl ethyl ketone                           | 584,814                    | 690                             | 0                     | 0                       | 0                                | 0                                  | 585,504                       | 1   | 585,505                                |
| 79-01-6    | Trichloroethylene                             | 525,388                    | 0                               | 0                     | 0                       | 0                                | 0                                  | 525,388                       | 0   | 525,388                                |
| 2837-89-0  | 2-Chloro-1,1,1,2-tetrafluoroethane (HCFC-124) | 513,173                    | 0                               | 0                     | 0                       | 0                                | 0                                  | 513,173                       | 0   | 513,173                                |
| 7664-41-7  | Ammonia                                       | 270,663                    | 21,340                          | 0                     | 0                       | 0                                | 0                                  | 292,003                       | 0   | 292,003                                |
| --         | Zinc compounds                                | 2,091                      | 29,592                          | 0                     | 0                       | 0                                | 284                                | 31,967                        | 233,764   | 265,731                                |
| 71-55-6    | 1,1,1-Trichloroethane                         | 216,041                    | 0                               | 0                     | 0                       | 0                                | 0                                  | 216,041                       | 0   | 216,041                                |
| 7440-39-3  | Barium  | 5                          | 0                               | 0                     | 0                       | 0                                | 0                                  | 5                             | 211,842   | 211,847                                |
| 76-13-1    | Freon 113                                     | 209,543                    | 0                               | 0                     | 0                       | 0                                | 0                                  | 209,543                       | 0   | 209,543                                |
| 110-82-7   | Cyclohexane                                   | 204,193                    | 0                               | 0                     | 0                       | 0                                | 0                                  | 204,193                       | 2   | 204,195                                |
|            | Subtotal                                      | 11,740,418                 | 1,098,198                       | 0                     | 0                       | 0                                | 288                                | 12,838,904                    | 446,717   | 13,285,621                             |
|            | Total for SIC Code 38                         | 13,201,411                 | 1,297,561                       | 0                     | 0                       | 0                                | 2,531                              | 14,501,503                    | 848,568   | 15,350,071                             |

**Note:** On-site Releases from Section 5 of Form R. Off-site Releases from Section 6 (off-site transfers to disposal) of Form R.



by the same parent company. One facility reported releasing 590,000 pounds of nitrate compounds to surface waters. The second facility (which also reported the air emissions cited above) reported 350,000 pounds. Together, they accounted for 93.3% of the surface water discharges of nitrate compounds reported by the instruments and photographic equipment sector in 1996.

The sector reported off-site releases (transfers to disposal) in the largest amounts for zinc compounds (234,000 pounds) and barium (212,000 pounds). Together, they accounted for 52.5% of the sector's total off-site releases. These chemicals ranked 11th and 13th, respectively, for total on- and off-site releases reported by the instruments and photographic equipment sector. As explained above, one facility reported 160,000 pounds of zinc compounds (71.4% of the total for this chemical), and one facility reported 212,000 pounds of barium (100.0% of the total for this chemical).

## **OSHA Carcinogens**

On- and off-site releases in this sector of chemicals designated OSHA carcinogens totaled 4.5 million pounds in 1996, as shown in Table 15-8. (OSHA carcinogens and the bases for their designation appear in Box 1-9 in Chapter 1.) Releases of OSHA carcinogens represented 29.1% of the sector's total releases. The majority (4.3 million pounds, or 96.3%) was released to air.

Two of the top 15 chemicals for total releases by the instruments and photographic equipment sector were carcinogens. These included the top-ranked chemical, dichloromethane, with 3.5 million pounds of releases, and the eighth-ranked chemical, trichloroethylene, with 525,000 pounds (see Table 15-7). The sector also reported releases of more than 50,000 pounds each for three other OSHA carcinogens: ethylene oxide (143,000 pounds), styrene (102,000 pounds), and acetaldehyde (51,000 pounds).

The photographic equipment industry (SIC code 3861) ranked first in the instruments and photographic equipment sector for releases of OSHA carcinogens, with a total of 3.3 million pounds, 72.9% of the sector's total. This industry reported 3.1 million pounds (72.4%) of the sector's air emissions of OSHA carcinogens; 50,000 pounds of surface water discharges (100.0%); and 91,000 pounds of off-site releases (transfers to disposal, 79.0%). The photographic equipment industry reported air emissions of dichloromethane totaling 3.0 million pounds, including 2.4 million pounds reported by one facility, mentioned earlier. The surgical and medical instruments industry (SIC code 3841) reported the second-largest total releases of OSHA carcinogens in this sector, with 388,000 pounds (8.7%), followed by the environmental controls industry (SIC code 3822) with 288,000 pounds (6.5%).

Figure 15-7 shows the on- and off-site releases of the four-digit SIC codes with the largest OSHA carcinogen releases.

## **1996 TRI Chemicals in Waste for Instruments and Photographic Equipment**

The instruments and photographic equipment industry reported production-related waste totaling 76.5 million pounds in 1996, as shown in Table 15-9. Nearly half (49.2%) of this total consisted of on-site treatment, which was 37.6 million pounds. The sector's second-largest waste management option in 1996 was releases; quantities released on- and off-site totaled 15.4 million pounds, or 20.2% of total production-related waste. The sector reported 12.7 million pounds of off-site recycling; this was 16.6% of total production-related waste and ranked third among waste management methods in the instruments and photographic equipment sector's reporting.



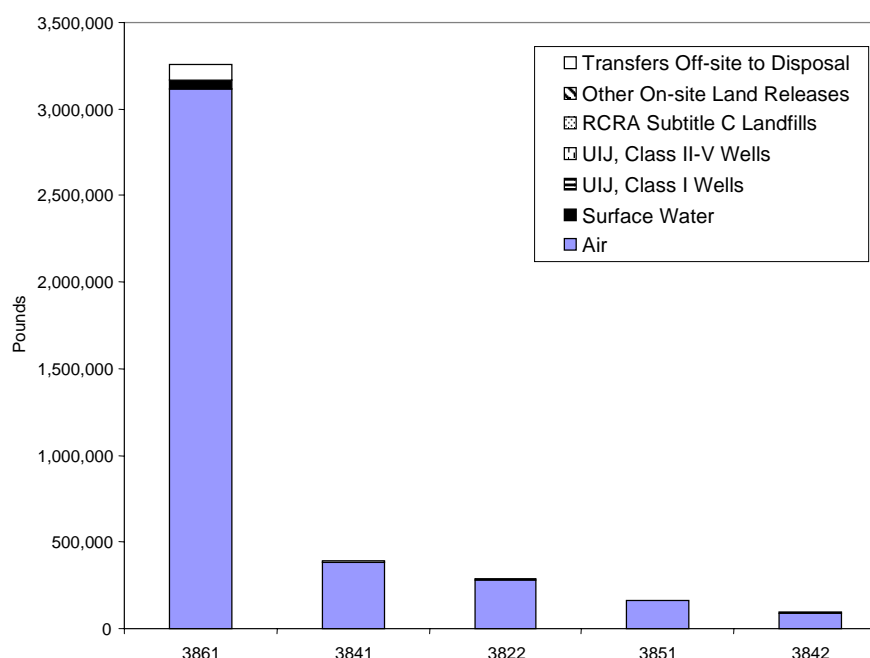


**Table 15-8. TRI On-site and Off-site Releases of OSHA Carcinogens by 4-digit SIC Code, 1996: Instruments and Photographic Equipment, SIC Code 38 (in Rank Order)**

| SIC Code | Industry                              | Total Air Emissions Pounds | Surface Water Discharges Pounds | Underground Injection |                         | On-site Land Releases            |                                    | Total On-site Releases Pounds | Off-site Releases Transfers Off-site to Disposal Pounds | Total On- and Off-site Releases Pounds |
|----------|---------------------------------------|----------------------------|---------------------------------|-----------------------|-------------------------|----------------------------------|------------------------------------|-------------------------------|---|--|
|          |                                       |                            |                                 | Class I Wells Pounds  | Class II-V Wells Pounds | RCRA Subtitle C Landfills Pounds | Other On-site Land Releases Pounds |                               |   |  |
| 3861     | Photographic Equipment & Supplies     | 3,116,511                  | 50,405                          | 0                     | 0                       | 0                                | 86                                 | 3,167,002                     | 90,592  | 3,257,594                              |
| 3841     | Surgical & Medical Instruments        | 382,814                    | 0                               | 0                     | 0                       | 0                                | 5                                  | 382,819                       | 5,061   | 387,880                                |
| 3822     | Environmental Controls                | 282,071                    | 0                               | 0                     | 0                       | 0                                | 260                                | 282,331                       | 5,959   | 288,290                                |
| 3851     | Ophthalmic Goods                      | 163,578                    | 0                               | 0                     | 0                       | 0                                | 0                                  | 163,578                       | 0   | 163,578                                |
| 3842     | Surgical Appliances & Supplies        | 89,467                     | 0                               | 0                     | 0                       | 0                                | 0                                  | 89,467                        | 5,228   | 94,695                                 |
|          | Multiple within SIC Code 38           | 78,976                     | 5                               | 0                     | 0                       | 0                                | 0                                  | 78,981                        | 510   | 79,491                                 |
| 3823     | Process Control Instruments           | 62,681                     | 0                               | 0                     | 0                       | 0                                | 36                                 | 62,717                        | 0   | 62,717                                 |
| 3827     | Optical Instruments & Lenses          | 29,184                     | 0                               | 0                     | 0                       | 0                                | 0                                  | 29,184                        | 0   | 29,184                                 |
| 3873     | Watches, Clocks, Watchcases & Parts   | 26,000                     | 0                               | 0                     | 0                       | 0                                | 0                                  | 26,000                        | 0   | 26,000                                 |
| 3843     | Dental Equipment & Supplies           | 16,013                     | 0                               | 0                     | 0                       | 0                                | 0                                  | 16,013                        | 0   | 16,013                                 |
| 3845     | Electromedical Equipment              | 8,747                      | 0                               | 0                     | 0                       | 0                                | 0                                  | 8,747                         | 7,100   | 15,847                                 |
| 3821     | Laboratory Apparatus & Furniture      | 11,015                     | 0                               | 0                     | 0                       | 0                                | 0                                  | 11,015                        | 5   | 11,020                                 |
| 3824     | Fluid Meters & Counting Devices       | 10,313                     | 0                               | 0                     | 0                       | 0                                | 0                                  | 10,313                        | 250   | 10,563                                 |
| 3829     | Measuring & Controlling Devices, nec* | 10,103                     | 0                               | 0                     | 0                       | 0                                | 0                                  | 10,103                        | 0   | 10,103                                 |
| 3812     | Search & Navigation Equipment         | 9,155                      | 0                               | 0                     | 0                       | 0                                | 0                                  | 9,155                         | 0   | 9,155                                  |
| 3844     | X-ray Apparatus & Tubes               | 6,018                      | 0                               | 0                     | 0                       | 0                                | 0                                  | 6,018                         | 5   | 6,023                                  |
| 3825     | Instruments to Measure Electricity    | 257                        | 0                               | 0                     | 0                       | 0                                | 0                                  | 257                           | 0   | 257                                    |
|          | Subtotal                              | 4,302,903                  | 50,410                          | 0                     | 0                       | 0                                | 387                                | 4,353,700                     | 114,710   | 4,468,410                              |
|          | Total for SIC Code 38                 | 13,201,411                 | 1,297,561                       | 0                     | 0                       | 0                                | 2,531                              | 14,501,503                    | 848,568   | 15,350,071                             |

**Note:** On-site Releases from Section 5 of Form R. Off-site Releases from Section 6 (off-site transfers to disposal) of Form R. Forms with more than one 4-digit SIC codes within SIC code 38 are assigned to the "multiple" category.

\*nec: not elsewhere classified.



**Figure 15-7. TRI On-site and Off-site Releases of OSHA Carcinogens, SIC Codes with Largest Totals, 1996: Instruments and Photographic Equipment (SIC Code 38)**

**Note:** On-site Releases from Section 5 of Form R. Off-site Releases from Section 6 (off-site transfers to disposal) of Form R. UIJ = underground injection.



## Chapter 15 — TRI Data for Instruments and Photographic Equipment

**Table 15-9. Quantities of TRI Chemicals in Waste by 4-digit SIC Code, 1996: Instruments and Photographic Equipment, SIC Code 38 (in Rank Order)**

| SIC Code              | Industry                              | Recycled On-site Pounds | Energy Recovery On-site Pounds | Treated On-site Pounds | Recycled Off-site Pounds | Energy Recovery Off-site Pounds | Treated Off-site Pounds | Quantity Released On- and Off-site Pounds | Total Production-related Waste Pounds | Non-Production-related Waste Pounds |
|-----------------------|---------------------------------------|-------------------------|--------------------------------|------------------------|--------------------------|---------------------------------|-------------------------|---|---------------------------------------|-------------------------------------|
| 3861                  | Photographic Equipment & Supplies     | 2,645,308               | 683,500                        | 33,351,145             | 3,724,835                | 2,024,805                       | 2,455,428               | 10,521,370                                | 55,406,391                            | 140,696                             |
| 3841                  | Surgical & Medical Instruments        | 678,671                 | 0                              | 2,939,465              | 1,466,859                | 96,546                          | 297,783                 | 1,802,683                                 | 7,282,007                             | 52                                  |
| 3822                  | Environmental Controls                | 44,905                  | 255,185                        | 5,265                  | 4,020,145                | 4,486                           | 45,800                  | 522,191                                   | 4,897,977                             | 0                                   |
| 3842                  | Surgical Appliances & Supplies        | 242,106                 | 0                              | 897,502                | 926,062                  | 0                               | 202,208                 | 480,186                                   | 2,748,064                             | 410                                 |
|                       | Multiple within SIC Code 38           | 13,560                  | 0                              | 291,948                | 584,495                  | 26,108                          | 134,121                 | 553,823                                   | 1,604,055                             | 350                                 |
| 3851                  | Ophthalmic Goods                      | 220,186                 | 0                              | 4,870                  | 319,659                  | 111,992                         | 89,371                  | 444,099                                   | 1,190,177                             | 1                                   |
| 3823                  | Process Control Instruments           | 0                       | 0                              | 24,060                 | 550,370                  | 4,101                           | 0                       | 72,729                                    | 651,260                               | 0                                   |
| 3827                  | Optical Instruments & Lenses          | 30,372                  | 0                              | 0                      | 12,496                   | 28,653                          | 60,000                  | 480,036                                   | 611,557                               | 0                                   |
| 3824                  | Fluid Meters & Counting Devices       | 0                       | 0                              | 44,229                 | 359,541                  | 0                               | 8,043                   | 42,213                                    | 454,026                               | 0                                   |
| 3829                  | Measuring & Controlling Devices, nec* | 24,448                  | 0                              | 0                      | 70,141                   | 8,800                           | 32                      | 148,066                                   | 251,487                               | 0                                   |
| 3825                  | Instruments to Measure Electricity    | 0                       | 0                              | 27,471                 | 156,918                  | 14,760                          | 27,726                  | 20,319                                    | 247,194                               | 0                                   |
| 3812                  | Search & Navigation Equipment         | 47,900                  | 0                              | 3,800                  | 37,552                   | 3,493                           | 25,037                  | 123,791                                   | 241,573                               | 50                                  |
| 3844                  | X-ray Apparatus & Tubes               | 2,179                   | 0                              | 18,081                 | 180,143                  | 0                               | 12,107                  | 26,692                                    | 239,202                               | 0                                   |
| 3821                  | Laboratory Apparatus & Furniture      | 0                       | 0                              | 5                      | 45,178                   | 75,328                          | 15,621                  | 101,198                                   | 237,330                               | 0                                   |
| 3843                  | Dental Equipment & Supplies           | 0                       | 0                              | 1,385                  | 122,054                  | 4,736                           | 0                       | 32,375                                    | 160,550                               | 0                                   |
| 3845                  | Electromedical Equipment              | 0                       | 0                              | 21,000                 | 91,970                   | 1,920                           | 0                       | 27,522                                    | 142,412                               | 0                                   |
| 3873                  | Watches, Clocks, Watchcases & Parts   | 11,100                  | 0                              | 15,026                 | 0                        | 0                               | 5,800                   | 26,474                                    | 58,400                                | 0                                   |
| 3826                  | Analytical Instruments                | 0                       | 0                              | 0                      | 0                        | 22,200                          | 20,400                  | 11,250                                    | 53,850                                | 0                                   |
| Total for SIC Code 38 |                                       | 3,960,735               | 938,685                        | 37,645,252             | 12,668,418               | 2,427,928                       | 3,399,477               | 15,437,017                                | 76,477,512                            | 141,559                             |

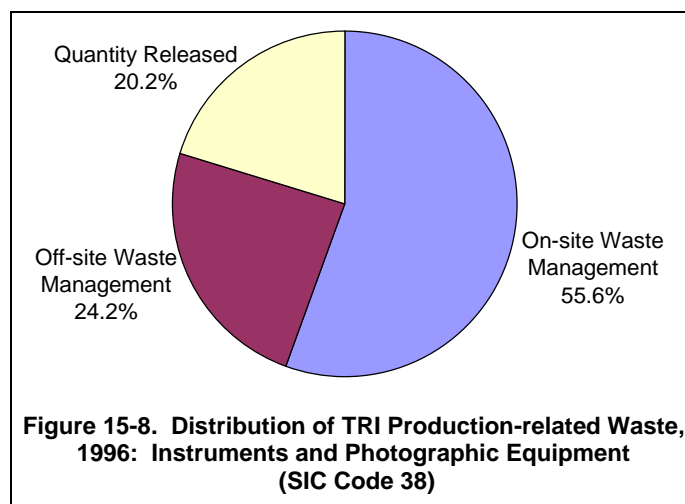
**Note:** Data from Section 8 of Form R. Forms with more than one 4-digit SIC code within SIC code 38 are assigned to the "multiple" category.

\*nec: not elsewhere classified.

Figure 15-8 illustrates the distribution of production-related waste by waste management category for the instruments and photographic equipment sector.

The photographic equipment industry (SIC code 3861) reported two-thirds or more of the sector's total for each waste management type except off-site recycling. For on-site waste management, this industry reported 2.6 million pounds of recycling, 684,000 pounds of energy recovery, and 33.4 million pounds of treatment. These were 66.8%, 72.8%, and 88.6% of the sector's totals in these on-site waste management categories. In off-site waste management types, this industry reported 3.7 million pounds (29.4%) of recycling, 2.0 million pounds (83.4%) of energy recovery, and 2.5 million pounds (72.2%) of treatment. The photographic equipment industry also reported 10.5 million pounds as released on- and off-site, which was 68.2% of that category.

The environmental controls industry (SIC code 3822) reported the sector's largest amount of off-site recycling (4.0 million pounds, or 31.7%). As



**Note:** Data from Section 8 of Form R.

noted, the environmental controls industry was also the only other industry in this sector to report on-site energy recovery (255,000 pounds, or 27.2%), besides the photographic equipment industry (SIC code 3861).

The surgical and medical instruments industry (SIC code 3841) ranked second in this sector for reporting of on-site recycling (679,000 pounds, or 17.1%), on-site treatment (2.9 million pounds, or



7.8%), off-site treatment (298,000 pounds, or 8.8%) and quantities released (1.8 million pounds, or 11.7%). The ophthalmic goods industry (SIC code 3851) ranked second for off-site energy recovery (112,000 pounds, or 4.6%).

Distribution of production-related waste for the top industries in the sector appears in Figure 15-9.

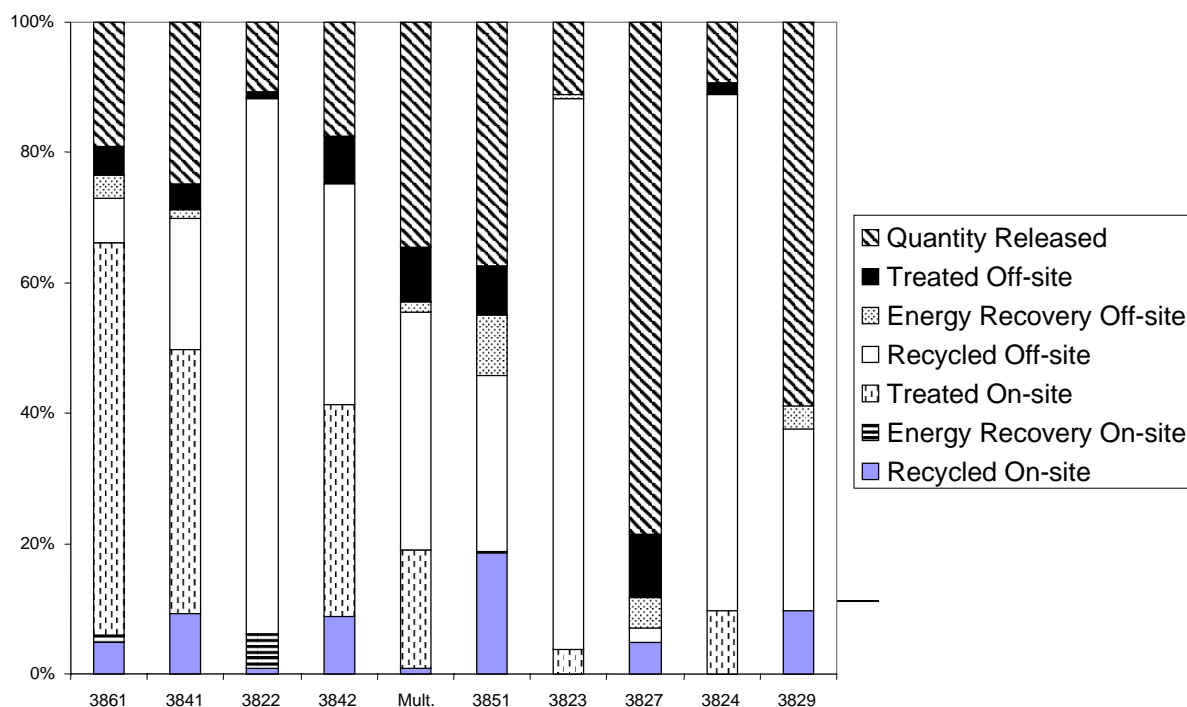
## Projected Quantities of TRI Chemicals in Waste

The instruments and photographic equipment sector's projections of waste management data through 1998 appear in Table 15-10. (As explained in Chapter 1, facilities not only report current data but project waste management quantities for the next two years in their TRI submissions.) Total production-related waste was projected to decrease

1.2% from 76.5 million pounds in 1996 to 75.5 million pounds in 1998.

The sector projected its largest reduction (in pounds and percent) in quantities released on- and off-site, from 15.4 million pounds to 13.4 million pounds, a projected 13.5% reduction. Decreases were also projected in on-site recycling, from 4.0 million pounds to 3.7 million pounds (a 6.4% reduction), and in off-site recycling, from 12.7 million pounds to 12.0 million pounds (a 5.5% reduction). A small reduction was expected in off-site treatment, from 3.40 million pounds to 3.36 million pounds (a 1.1% reduction).

On-site treatment was expected to increase 5.4%, from 37.6 million pounds to 39.7 million pounds. The sector projected a smaller absolute increase in on-site energy recovery (from 939,000 pounds to



**Figure 15-9. Distribution of Production-related Waste, SIC Codes with Largest Totals, 1996: Instruments and Photographic Equipment (SIC Code 38)**

**Note:** Data from Section 8 of Form R. Forms with more than one 4-digit SIC code within SIC code 38 are assigned to the "multiple" category.



## Chapter 15 — TRI Data for Instruments and Photographic Equipment

**Table 15-10. Current Year and Projected Quantities of TRI Chemicals in Waste, 1996-1998: Instruments and Photographic Equipment, SIC Code 38**

| Waste Management Activity                      | Current Year 1996 |                  | Projected 1997 |                  | Projected 1998 |                  |
|--|-------------------|------------------|----------------|------------------|----------------|------------------|
|  | Total Pounds      | Percent of Total | Total Pounds   | Percent of Total | Total Pounds   | Percent of Total |
| <u>On-site Waste Management</u>                |                   |                  |                |                  |                |                  |
| Recycled On-site                               | 3,960,735         | 5.2              | 3,803,206      | 5.1              | 3,706,975      | 4.9              |
| Energy Recovery On-site                        | 938,685           | 1.2              | 1,040,000      | 1.4              | 1,040,000      | 1.4              |
| Treated On-site                                | 37,645,252        | 49.2             | 38,710,727     | 51.4             | 39,663,495     | 52.5             |
| <u>Off-site Waste Management</u>               |                   |                  |                |                  |                |                  |
| Recycled Off-site                              | 12,668,418        | 16.6             | 12,297,895     | 16.3             | 11,972,663     | 15.9             |
| Energy Recovery Off-site                       | 2,427,928         | 3.2              | 2,432,048      | 3.2              | 2,435,010      | 3.2              |
| Treated Off-site                               | 3,399,477         | 4.4              | 3,284,967      | 4.4              | 3,361,429      | 4.5              |
| Quantity Released On- and Off-site             | 15,437,017        | 20.2             | 13,729,106     | 18.2             | 13,352,238     | 17.7             |
| Total Production-related Waste for SIC Code 38 | 76,477,512        | 100.0            | 75,297,949     | 100.0            | 75,531,810     | 100.0            |

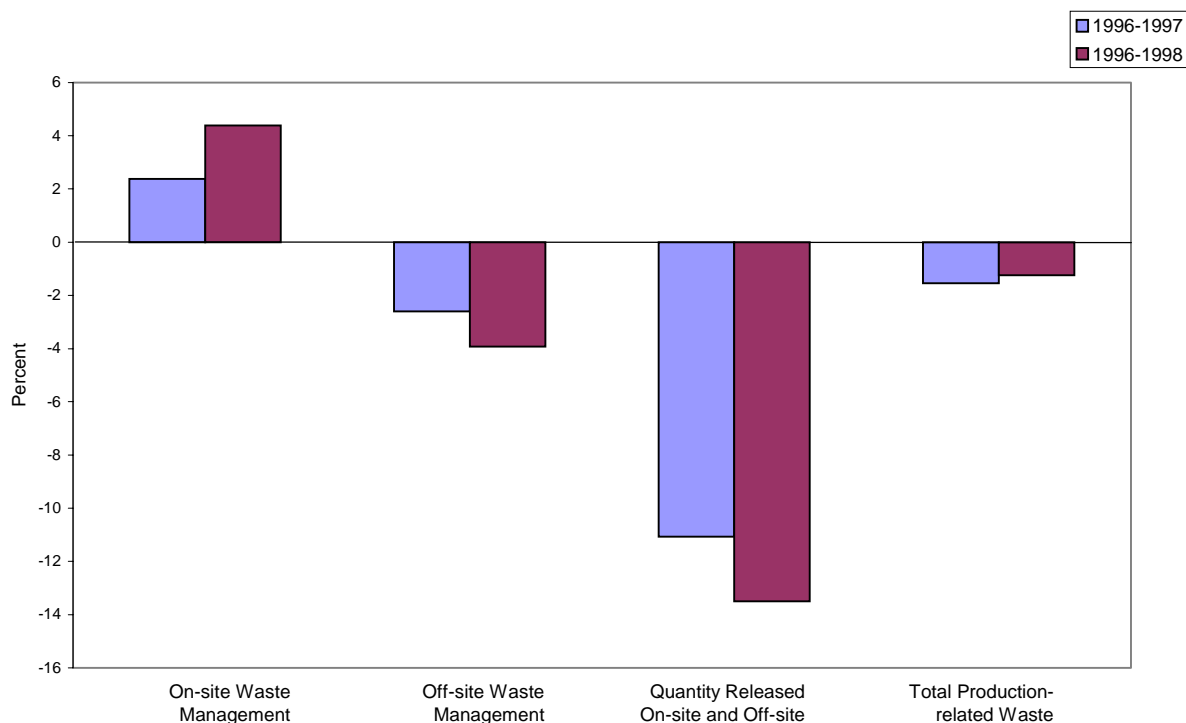
| Waste Management Activity                      | Projected Change     | Projected Change     | Projected Change     |
|--|----------------------|----------------------|----------------------|
|  | 1996-1997<br>Percent | 1997-1998<br>Percent | 1996-1998<br>Percent |
| <u>On-site Waste Management</u>                |                      |                      |                      |
| Recycled On-site                               | -4.0                 | -2.5                 | -6.4                 |
| Energy Recovery On-site                        | 10.8                 | 0.0                  | 10.8                 |
| Treated On-site                                | 2.8                  | 2.5                  | 5.4                  |
| <u>Off-site Waste Management</u>               |                      |                      |                      |
| Recycled Off-site                              | -2.9                 | -2.6                 | -5.5                 |
| Energy Recovery Off-site                       | 0.2                  | 0.1                  | 0.3                  |
| Treated Off-site                               | -3.4                 | 2.3                  | -1.1                 |
| Quantity Released On- and Off-site             | -11.1                | -2.7                 | -13.5                |
| Total Production-related Waste for SIC Code 38 | -1.5                 | 0.3                  | -1.2                 |

**Note:** Current year and projected year amounts are all taken from Section 8 of Form R for 1996.

1.0 million pounds), although this represented a 10.8% increase. Minimal change was projected in off-site energy recovery.

Figure 15-10 illustrates the projected percentage changes for the instruments and photographic equipment sector from 1996 to 1998.

These projected changes represent some potential improvement in the sector's management of TRI chemicals in waste. Although total production-related waste was expected to decrease only modestly from 1996 to 1998, the projections indicate a shift from releases to treatment among methods of managing waste. Treatment (on- and



**Figure 15-10. Projected Percentage Change in Quantities of TRI Chemicals in Waste, 1996-1998: Instruments and Photographic Equipment (SIC Code 38)**

**Note:** Current year and projected year amounts are all taken from Section 8 of Form R. for 1996.

off-site) was projected to rise as a percentage of total production-related waste (from approximately 54% to 57%), while releases were expected to decline (from 20% to nearly 18%). Although not the most preferred option in the waste management hierarchy (explained in Chapter 1), treatment is more desirable than releases.

### Source Reduction Activity

As shown in Table 15-11, more than one-fourth (27.9%) of the forms submitted by the instruments and photographic equipment sector indicated one or more source activities underway in 1996. Of the 197 forms indicating such activity, the photographic equipment industry (SIC code 3861) submitted 69 (also one-fourth, or 27.5%, of the forms in that industry). The surgical and medical instruments industry (SIC code 3841) submitted 31 forms indicating source reduction activity (25.6%).

Improvements in operating practices were the most frequently reported source reduction activity (99 forms). Sixty forms reported process modifications, which more often indicate innovative actions to reduce TRI chemicals in waste at their source.

## Year-to-Year Comparisons for Instruments and Photographic Equipment

### 1995-1996 TRI Data for Instruments and Photographic Equipment

From 1995 to 1996, the number of forms submitted in the instruments and photographic equipment sector decreased 9.7% from 783 forms to 707



## Chapter 15 — TRI Data for Instruments and Photographic Equipment

**Table 15-11. Number of Forms Reporting Source Reduction Activity, 1996: Instruments and Photographic Equipment, SIC Code 38**

| SIC Code | Industry                              | Total Forms Number | Forms Reporting Source Reduction Activities |                              | Category of Source Reduction Activity |                          |                                  |                                   |                              |                                |  |                              |
|----------|---------------------------------------|--------------------|---|------------------------------|---------------------------------------|--------------------------|----------------------------------|-----------------------------------|------------------------------|--------------------------------|--|------------------------------|
|          |                                       |                    | Number                                      | Percent of All Forms Percent | Good Operating Practices Number       | Inventory Control Number | Spill and Leak Prevention Number | Raw Material Modifications Number | Process Modifications Number | Cleaning and Degreasing Number | Surface Preparation and Finishing Number | Product Modifications Number |
| 3812     | Search & Navigation Equipment         | 13                 | 5   | 38.5                         | 1                                     | 0                        | 0                                | 2                                 | 0                            | 3                              | 0  | 0                            |
| 3821     | Laboratory Apparatus & Furniture      | 22                 | 4   | 18.2                         | 1                                     | 0                        | 0                                | 3                                 | 0                            | 0                              | 0  | 3                            |
| 3822     | Environmental Controls                | 62                 | 14  | 22.6                         | 9                                     | 1                        | 1                                | 3                                 | 8                            | 6                              | 2  | 0                            |
| 3823     | Process Control Instruments           | 23                 | 3   | 13.0                         | 2                                     | 0                        | 0                                | 0                                 | 1                            | 1                              | 0  | 0                            |
| 3824     | Fluid Meters & Counting Devices       | 19                 | 8   | 42.1                         | 8                                     | 0                        | 0                                | 0                                 | 1                            | 0                              | 0  | 4                            |
| 3825     | Instruments to Measure Electricity    | 9                  | 3   | 33.3                         | 2                                     | 1                        | 1                                | 0                                 | 1                            | 0                              | 0  | 0                            |
| 3826     | Analytical Instruments                | 2                  | 0   | 0.0                          | 0                                     | 0                        | 0                                | 0                                 | 0                            | 0                              | 0  | 0                            |
| 3827     | Optical Instruments & Lenses          | 12                 | 6   | 50.0                         | 4                                     | 0                        | 0                                | 0                                 | 1                            | 3                              | 0  | 0                            |
| 3829     | Measuring & Controlling Devices, nec* | 17                 | 7   | 41.2                         | 0                                     | 0                        | 0                                | 0                                 | 4                            | 3                              | 0  | 0                            |
| 3841     | Surgical & Medical Instruments        | 121                | 31  | 25.6                         | 8                                     | 1                        | 3                                | 9                                 | 13                           | 9                              | 2  | 0                            |
| 3842     | Surgical Appliances & Supplies        | 45                 | 15  | 33.3                         | 11                                    | 5                        | 4                                | 0                                 | 5                            | 0                              | 0  | 0                            |
| 3843     | Dental Equipment & Supplies           | 19                 | 1   | 5.3                          | 1                                     | 1                        | 0                                | 0                                 | 1                            | 0                              | 0  | 0                            |
| 3844     | X-ray Apparatus & Tubes               | 13                 | 4   | 30.8                         | 1                                     | 1                        | 0                                | 0                                 | 0                            | 2                              | 0  | 0                            |
| 3845     | Electromedical Equipment              | 9                  | 1   | 11.1                         | 1                                     | 0                        | 0                                | 0                                 | 0                            | 0                              | 0  | 0                            |
| 3851     | Ophthalmic Goods                      | 27                 | 10  | 37.0                         | 4                                     | 0                        | 0                                | 3                                 | 3                            | 3                              | 2  | 0                            |
| 3861     | Photographic Equipment & Supplies     | 251                | 69  | 27.5                         | 42                                    | 15                       | 7                                | 15                                | 14                           | 9                              | 3  | 10                           |
| 3873     | Watches, Clocks, Watchcases & Parts   | 3                  | 2   | 66.7                         | 1                                     | 0                        | 1                                | 1                                 | 0                            | 0                              | 1  | 0                            |
|          | Multiple within SIC Code 38           | 40                 | 14  | 35.0                         | 3                                     | 1                        | 0                                | 1                                 | 8                            | 3                              | 0  | 1                            |
|          | Total for SIC Code 38                 | 707                | 197   | 27.9                         | 99                                    | 26                       | 17                               | 37                                | 60                           | 42                             | 10                                       | 18                           |

**Note:** Forms with more than one 4-digit SIC code within SIC code 38 are assigned to the "multiple" category.

**\*nec:** not elsewhere classified.

forms, as shown in Table 15-12. There was no change in the number of Form A submissions. (The Form A certification statement is explained in Chapter 1.)

### On- and Off-site Releases

On- and off-site releases reported by the instruments and photographic equipment sector decreased 14.0% from 17.9 million pounds in 1995 to 15.4 million pounds in 1996, as shown in Table 15-12. This reduction reflected a larger decrease in air emissions, from 16.2 million pounds in 1995 to 13.2 million pounds in 1996. The sector reported reductions in both fugitive and point-source emissions for a net reduction of 18.3% in air emissions. Partly off-setting the decrease in reported air emissions, surface water discharges increased 47.4% from 880,000 pounds to 1.3 million pounds. One facility reported 370,000 pounds of this 417,000 pound increase in surface water discharges. This facility reported discharges

of 220,000 pounds of nitrate compounds in 1995 and 590,000 pounds in 1996.

The sector also reported a small reduction in on-site land releases (from 6,000 pounds to 3,000 pounds) and a small increase in off-site releases (transfers to disposal, from 812,000 pounds to 849,000 pounds).

Figure 15-11 illustrates the sector's percentage change in on- and off-site releases from 1995 to 1996.

### Other On-site Waste Management

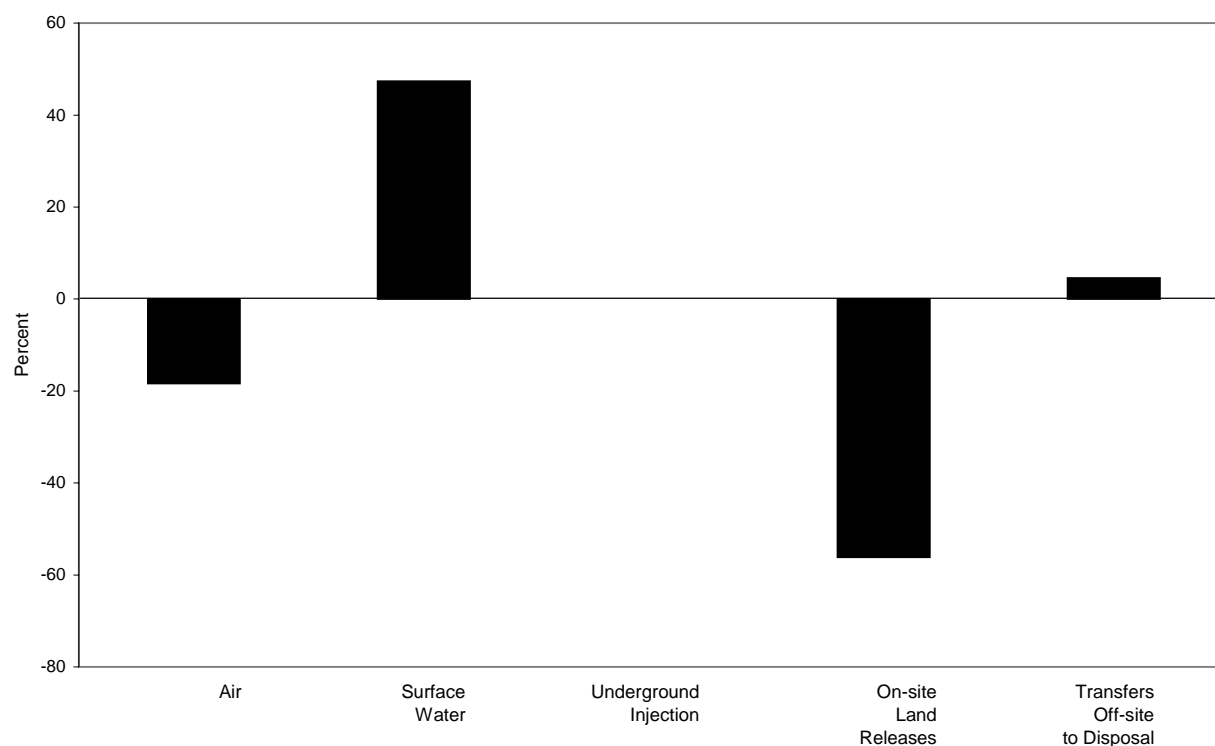
The instruments and photographic equipment sector reported a reduction in other on-site waste management from 43.5 million pounds in 1995 to 42.5 million pounds in 1996, as shown in Table 15-12. This reduction of 1.0 million pounds (or 2.3%) consisted primarily of a decrease in on-site recycling, from 4.8 million pounds to 4.0 million pounds (a 17.9% decrease). A smaller reduction, in



**Table 15-12. Comparison of TRI On-site and Off-site Releases, Other On-site Waste Management, and Transfers Off-site for Further Waste Management, 1995-1996: Instruments and Photographic Equipment, SIC Code 38**

|  | 1995<br>Number | 1996<br>Number | Change<br>1995 to 1996<br>Percent |
|--|----------------|----------------|-----------------------------------|
| Total Facilities                                       | 315            | 291            | -7.6                              |
| Total Forms  | 783            | 707            | -9.7                              |
| Form Rs  | 737            | 661            | -10.3                             |
| Form As  | 46             | 46             | 0.0                               |
|  | Pounds         | Pounds         | Percent                           |
| <u>On-site Releases</u>                                |                |                |                                   |
| Total Air Emissions                                    | 16,161,028     | 13,201,411     | -18.3                             |
| Fugitive Air   | 3,702,047      | 2,698,043      | -27.1                             |
| Point Source Air                                       | 12,458,981     | 10,503,368     | -15.7                             |
| Surface Water Discharges                               | 880,407        | 1,297,561      | 47.4                              |
| Underground Injection                                  | 0              | 0              | --                                |
| On-site Land Releases                                  | 5,766          | 2,531          | -56.1                             |
| Total On-site Releases                                 | 17,047,201     | 14,501,503     | -14.9                             |
| <u>Off-site Releases</u>                               |                |                |                                   |
| Transfers Off-site to Disposal                         | 811,573        | 848,568        | 4.6                               |
| Total On- and Off-site Releases                        | 17,858,774     | 15,350,071     | -14.0                             |
| <u>Other On-site Waste Management</u>                  |                |                |                                   |
| Recycled On-site                                       | 4,823,958      | 3,960,735      | -17.9                             |
| Energy Recovery On-site                                | 906,685        | 938,685        | 3.5                               |
| Treated On-site  | 37,802,093     | 37,645,252     | -0.4                              |
| Total Other On-site Waste Management                   | 43,532,736     | 42,544,672     | -2.3                              |
| <u>Transfers Off-site for Further Waste Management</u> |                |                |                                   |
| Transfers to Recycling                                 | 14,557,030     | 12,245,918     | -15.9                             |
| Transfers to Energy Recovery                           | 2,331,285      | 2,366,341      | 1.5                               |
| Transfers to Treatment                                 | 3,698,259      | 2,480,361      | -32.9                             |
| Transfers to POTWs                                     | 895,282        | 930,896        | 4.0                               |
| Other Off-site Transfers                               | 0              | 44,588         | --                                |
| Total Transfers Off-site for Further Waste Management  | 21,481,856     | 18,068,104     | -15.9                             |

**Note:** **On-site Releases** from Section 5 of Form R and **Off-site Releases** from Section 6 (transfers off-site to disposal) of Form R. **Other On-site Waste Management** from Section 8 of Form R. **Transfers Off-site for Further Waste Management** from Section 6 (excluding transfers off-site to disposal) of Form R. Breakdown of Underground Injection and On-site Land Releases not required in 1995. Other Off-site Transfers are transfers reported without a valid waste management code.



**Figure 15-11. Percentage Change in On-site and Off-site Releases, 1995-1996: Instruments and Photographic Equipment (SIC Code 38)**

**Note:** On-site Releases from Section 5 of Form R and Off-site Releases from Section 6 (transfers off-site to disposal) of Form R. Breakdown of Underground Injection and On-site Land Releases not required in 1995.

both pounds and percent, occurred in reported on-site treatment, from 37.8 million pounds to 37.6 million pounds (a 0.4% decrease). The sector reported a small increase in on-site energy recovery, from 907,000 pounds to 939,000 pounds (a 3.5% increase).

#### Transfers Off-site for Further Waste Management

Table 15-12 also presents the instruments and photographic equipment sector's reporting of transfers off-site for further waste management in 1995 and 1996. The sector reported 21.5 million pounds of such transfers in 1995 and 18.1 million pounds in 1996, a reduction of 15.9% or 3.4 million pounds.

The principal areas of reduction were transfers to recycling, from 14.6 million pounds to 12.2 million pounds, and transfers to treatment, from 3.7 million pounds to 2.5 million pounds. The 2.3 million-pound reduction in transfers to recycling represented a 15.9% decrease, while the 1.2 million-pound reduction in transfers to treatment represented a 32.9% decrease.

The sector reported small increases in the other types of transfers off-site for further waste management. Transfers to energy recovery increased from 2.33 million pounds to 2.37 million pounds and transfers to POTWs increased from 895,000 pounds to 931,000 pounds.





## Changes in SIC Codes

As indicated in facility descriptions below, some facilities report different SIC codes over time. This may reflect new or discontinued lines of production, or it may represent a different understanding of how SIC code designations relate to a facility's business activities. These changes can contribute—sometimes largely—to apparent increases or decreases across comparison years in the amounts reported by the four-digit, or even two-digit, SIC codes.

## 1988-1996 TRI Data for Instruments and Photographic Equipment

As explained in Chapter 1, comparisons from the 1988 TRI baseline year to the current year rely on the list of “core” TRI chemicals that were reportable, with the same reporting definition, in all years. These multi-year comparisons also review only the data elements that were collected in all years, which excludes from this section any analysis that distinguishes RCRA subtitle C landfills from other land releases as well as analysis based on the types of underground injection wells. On-site waste management data and transfers off-site to recycling and to energy recovery have been collected only since 1991; these data are included, but cannot be compared across the full 1988-1996 period.

As shown in Table 15-13, the number of forms submitted by the instruments and photographic equipment sector decreased by one-third (34.1%) from 900 forms in 1988 to 593 forms in 1996.

The sector reported decreases in all types of on- and off-site releases, for an overall reduction of 82.2% from 58.1 million pounds of total releases in 1988 to 10.4 million pounds in 1996. Most of this reduction occurred in reporting of air emissions, which decreased from 46.5 million pounds to 9.3 million pounds, an 80.0% decrease. About two-thirds of the reduction in air emissions was reported

in point-source emissions and the remainder in fugitive emissions.

Off-site releases reported by the instruments and photographic equipment sector decreased by an even greater percentage—92.7%—from 10.9 million pounds in 1988 to 794,000 pounds in 1996. The sector also reported reductions from 1988 to 1996 in surface water discharges (from 390,000 pounds to 264,000 pounds), underground injection (250 pounds to zero), and on-site land releases (from 340,000 pounds to 3,000 pounds).

Figure 15-12 illustrates the sector's percentage reductions in on- and off-site releases from 1988 to 1996.

On-site waste management and transfers off-site for recycling or energy recovery were not collected in 1988. For the 1994-1996 period, the instruments and photographic equipment sector reported an increase in other on-site waste management from 34.3 million pounds to 39.7 million pounds, a 5.4 million-pound increase. On-site treatment increased from 30.1 million pounds to 35.6 million pounds, a 5.5 million-pound increase. One facility in the photographic equipment industry (SIC code 3861) reported treating 11.0 million pounds of methanol on-site in 1994 and 14.0 million pounds in both 1995 and 1996, accounting for 3.0 million pounds of this increase.

The sector reported 3.5 million pounds of on-site recycling in 1994 and 3.4 million pounds in 1996, a 129,000 pound reduction. Reporting of on-site energy recovery showed essentially no net change for 1994 to 1996.

The instruments and photographic equipment sector reported decreases for the two transfer types that were reportable for the full 1988-1996 comparison period. The sector reported 6.8 million pounds of transfers to treatment in 1988 and 2.0 million pounds in 1996, a 70.4% reduction. For transfers to POTWs, the sector reported 2.3 million pounds in

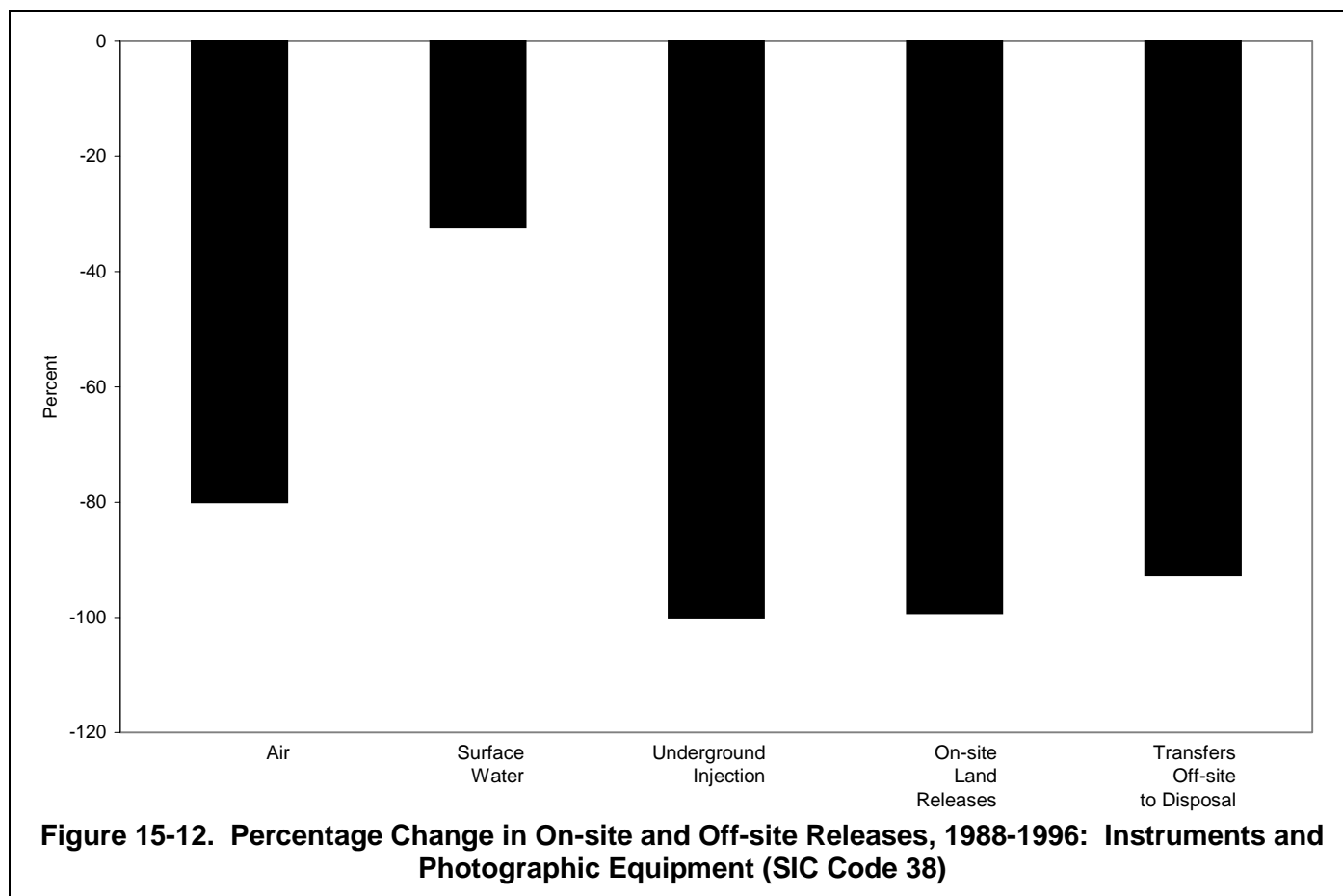


## Chapter 15 — TRI Data for Instruments and Photographic Equipment

**Table 15-13. Comparison of TRI On-site and Off-site Releases, Other On-site Waste Management, and Transfers Off-site for Further Waste Management, 1988 and 1994-1996: Instruments and Photographic Equipment, SIC Code 38**

|  | 1988<br>Number | 1994<br>Number | 1995<br>Number | 1996<br>Number | Change<br>1988 to 1996<br>Percent |
|--|----------------|----------------|----------------|----------------|-----------------------------------|
| Total Facilities                                       | 366            | 299            | 280            | 258            | -29.5                             |
| Total Forms  | 900            | 696            | 658            | 593            | -34.1                             |
| Form Rs  | 900            | 696            | 622            | 558            | -38.0                             |
| Form As  | NA             | NA             | 36             | 35             | NA                                |
|  | Pounds         | Pounds         | Pounds         | Pounds         | Percent                           |
| <u>On-site Releases</u>                                |                |                |                |                |                                   |
| Total Air Emissions                                    | 46,478,774     | 13,192,730     | 11,917,203     | 9,298,517      | -80.0                             |
| Fugitive Air   | 15,991,517     | 4,203,661      | 3,330,729      | 2,285,024      | -85.7                             |
| Point Source Air                                       | 30,487,257     | 8,989,069      | 8,586,474      | 7,013,493      | -77.0                             |
| Surface Water Discharges                               | 390,382        | 319,552        | 249,173        | 264,207        | -32.3                             |
| Underground Injection                                  | 250            | 0              | 0              | 0              | -100.0                            |
| On-site Land Releases                                  | 340,403        | 7,074          | 5,766          | 2,527          | -99.3                             |
| Total On-site Releases                                 | 47,209,809     | 13,519,356     | 12,172,142     | 9,565,251      | -79.7                             |
| <u>Off-site Releases</u>                               |                |                |                |                |                                   |
| Transfers Off-site to Disposal                         | 10,875,015     | 808,871        | 783,071        | 793,368        | -92.7                             |
| Total On- and Off-site Releases                        | 58,084,824     | 14,328,227     | 12,955,213     | 10,358,619     | -82.2                             |
| <u>Other On-site Waste Management</u>                  |                |                |                |                |                                   |
| Recycled On-site                                       | NA             | 3,545,406      | 4,394,514      | 3,416,096      | NA                                |
| Energy Recovery On-site                                | NA             | 683,300        | 610,500        | 683,500        | NA                                |
| Treated On-site  | NA             | 30,110,570     | 34,798,073     | 35,644,985     | NA                                |
| Total Other On-site Waste Management                   | NA             | 34,339,276     | 39,803,087     | 39,744,581     | NA                                |
| <u>Transfers Off-site for Further Waste Management</u> |                |                |                |                |                                   |
| Transfers to Recycling                                 | NA             | 14,502,234     | 14,108,639     | 11,869,784     | NA                                |
| Transfers to Energy Recovery                           | NA             | 3,084,265      | 2,278,045      | 2,294,303      | NA                                |
| Transfers to Treatment                                 | 6,825,419      | 4,181,694      | 3,055,465      | 2,022,588      | -70.4                             |
| Transfers to POTWs                                     | 2,267,406      | 695,744        | 558,049        | 498,696        | -78.0                             |
| Other Off-site Transfers                               | 196,621        | 0              | 0              | 44,588         | -77.3                             |
| Total Transfers Off-site for Further Waste Management  | NA             | 22,463,937     | 20,000,198     | 16,729,959     | NA                                |

**Note:** Does not include delisted chemicals, chemicals added in 1990, 1991, 1994, and 1995, and aluminum oxide, ammonia, hydrochloric acid, and sulfuric acid. **On-site Releases** from Section 5 of Form R and **Off-site Releases** from Section 6 (transfers off-site to disposal) of Form R. **Other On-site Waste Management** from Section 8 of Form R. **Transfers Off-site for Further Waste Management** from Section 6 (excluding transfers off-site to disposal) of Form R. Breakdown of Underground Injection and On-site Land Releases not required before 1996. For 1994-1996, Other Off-site Transfers are transfers reported without a valid waste management code. For 1988, Other Off-site Transfers are transfers reported without a valid waste management code or codes not required to be reported in 1988. NA: not required to be reported in that year.



**Note:** Does not include delisted chemicals, chemicals added in 1990, 1991, 1994, and 1995, and aluminum oxide, ammonia, hydrochloric acid, and sulfuric acid. **On-site Releases** from Section 5 of Form R and **Off-site Releases** from Section 6 (transfers off-site to disposal) of Form R. Breakdown of Underground Injection and On-site Land Releases not required before 1996.

1988 and 499,000 pounds in 1996, a 78.0% reduction.

#### 1988-1996 Data for Four-Digit Industries in Instruments and Photographic Equipment

Tables 15-14 through 15-16 summarize data for 1988 and 1994-1996 for industries at the four-digit SIC code level within SIC code 38. The tables present, respectively, on- and off-site releases, other on-site waste management, and transfers off-site for further waste management.

#### **On- and Off-site Releases**

The photographic equipment industry (SIC code 3861) reported the instruments and photographic

equipment sector's largest decrease in on- and off-site releases from 1988 to 1996. This industry reported 38.2 million pounds of total releases in 1988 and 7.5 million pounds in 1996. Roughly two-thirds of the photographic equipment industry's reduction was reported in air emissions and one-third in off-site releases (transfers to disposal). The surgical and medical instruments industry (SIC code 3841) ranked second for decreases, reporting 5.6 million pounds in 1988 and 769,000 pounds in 1996. Ranking third, the environmental controls industry (SIC code 3822) reported a reduction from 1.9 million pounds to 492,000 pounds. The majority of the reductions by the surgical and medical instruments industry and the environmental controls industry occurred in reporting of air emissions.



The optical instruments and lenses industry (SIC code 3827) ranked first for increased releases reported by the instruments and photographic equipment sector, with 213,000 pounds in 1988 and 481,000 pounds in 1996. The increase was attributable to increased reporting of off-site releases (transfers to disposal) since 1994. The x-ray apparatus and tubes industry (SIC code 3844) ranked second for increases. This industry submitted no reports in 1988, but reported 39,000 pounds of releases in 1996 (reported releases were higher in 1995 than in either 1994 or 1996). No other instruments and photographic equipment industry recorded an increase in total releases from 1988 to 1996.

Table 15-14 provides release data for all four-digit SIC codes in the instruments and photographic equipment sector, for 1988-1996.

### **Other On-site Waste Management**

The surgical appliances and supplies industry (SIC code 3842) ranked first in the sector for reductions in other on-site waste management from 1994 to 1996 (on-site waste management data were not collected in 1988). This industry reported 1.5 million pounds in 1994 and 906,000 pounds in 1996, and the reduction occurred in reporting of on-site treatment. The miscellaneous measuring and controlling devices industry (SIC code 3829) reported the sector's second-largest decrease, from 459,000 pounds to 24,000 pounds. This decrease was attributable to a reduction in reporting of on-site recycling. Ranking third, the search and navigation equipment industry (SIC code 3812) reported a reduction from 398,000 pounds to 52,000 pounds. Most of this reduction also occurred in reporting of on-site recycling.

The photographic equipment industry (SIC code 3861) reported the largest increase, from 29.2 million pounds in 1994 to 34.9 million pounds in 1996. The surgical and medical instruments industry (SIC code 3841) ranked second for increases, reporting 2.1 million pounds in 1994 and

3.3 million pounds in 1996. These were also the industries with the largest decreases in releases for 1988 to 1996, as described above. In both the photographic equipment industry and the surgical and medical instruments industry, the increase in other on-site waste management occurred from 1994 to 1995, and both industries reported little change from 1995 to 1996. Most of the increase in both industries was reported in on-site treatment, as well as on-site recycling.

The multiple-codes forms in SIC code 38 reported the sector's third-largest increase, from 220,000 pounds to 306,000 pounds. This increase was attributable to on-site treatment.

On-site waste management data for 1994-1996 appear in Table 15-15.

### **Transfers Off-site for Further Waste Management**

The photographic equipment industry (SIC code 3861) reported the sector's largest decrease in transfers off-site for further waste management from 1994 to 1996 (data for some types of off-site transfers were not collected in 1988). This industry also had the largest decrease in releases, but reported the largest increase in other on-site waste management, as discussed above. The photographic equipment industry reported 11.2 million pounds of transfers off-site for further waste management in 1994 and 7.3 million pounds in 1996, with decreases in all types, especially transfers to recycling and to treatment.

The environmental controls industry (SIC code 3822) ranked second for decreases, reporting 4.7 million pounds in 1994 and approximately 4.0 million pounds in both 1995 and 1996. The fluid meters and counting devices industry (SIC code 3824) ranked third, with 702,000 pounds in 1994 and 360,000 pounds in 1996 (the 1995 level was higher, at 728,000 pounds). For both industries, the largest reduction occurred in reporting of transfers to recycling.



**Table 15-14. TRI On-site and Off-site Releases by 4-digit SIC Code, 1988 and 1994-1996: Instruments and Photographic Equipment, SIC Code 38**

| SIC Code | Industry                              | Year | On-site Releases           |                                 |                              |                         | Total On-site Releases Pounds | Off-site Releases                     | Total On- and Off-site Releases Pounds |
|----------|---------------------------------------|------|----------------------------|---------------------------------|------------------------------|-------------------------|-------------------------------|---------------------------------------|--|
|          |                                       |      | Total Air Emissions Pounds | Surface Water Discharges Pounds | Underground Injection Pounds | Releases to Land Pounds |                               | Transfers Off-site to Disposal Pounds |  |
| 3812     | Search & Navigation Equipment         | 96   | 88,965                     | 0                               | 0                            | 0                       | 88,965                        | 4,000                                 | 92,965                                 |
|          |                                       | 95   | 220,619                    | 0                               | 0                            | 0                       | 220,619                       | 19,000                                | 239,619                                |
|          |                                       | 94   | 557,333                    | 0                               | 0                            | 0                       | 557,333                       | 12,600                                | 569,933                                |
|          |                                       | 88   | 1,296,791                  | 503                             | 0                            | 0                       | 1,297,294                     | 61,182                                | 1,358,476                              |
| 3821     | Laboratory Apparatus & Furniture      | 96   | 99,179                     | 5                               | 0                            | 0                       | 99,184                        | 265                                   | 99,449                                 |
|          |                                       | 95   | 179,683                    | 5                               | 0                            | 0                       | 179,688                       | 265                                   | 179,953                                |
|          |                                       | 94   | 196,859                    | 5                               | 0                            | 5                       | 196,869                       | 1,000                                 | 197,869                                |
|          |                                       | 88   | 109,876                    | 0                               | 0                            | 0                       | 109,876                       | 70                                    | 109,946                                |
| 3822     | Environmental Controls                | 96   | 424,755                    | 60                              | 0                            | 1,042                   | 425,857                       | 66,290                                | 492,147                                |
|          |                                       | 95   | 452,217                    | 141                             | 0                            | 2,275                   | 454,633                       | 92,476                                | 547,109                                |
|          |                                       | 94   | 702,300                    | 69                              | 0                            | 2,040                   | 704,409                       | 104,350                               | 808,759                                |
|          |                                       | 88   | 1,719,352                  | 20                              | 0                            | 180,113                 | 1,899,485                     | 36,477                                | 1,935,962                              |
| 3823     | Process Control Instruments           | 96   | 74,107                     | 17                              | 0                            | 79                      | 74,203                        | 0                                     | 74,203                                 |
|          |                                       | 95   | 89,122                     | 0                               | 0                            | 750                     | 89,872                        | 550                                   | 90,422                                 |
|          |                                       | 94   | 174,976                    | 0                               | 0                            | 750                     | 175,726                       | 500                                   | 176,226                                |
|          |                                       | 88   | 784,215                    | 304                             | 0                            | 0                       | 784,519                       | 159,821                               | 944,340                                |
| 3824     | Fluid Meters & Counting Devices       | 96   | 11,108                     | 25                              | 0                            | 0                       | 11,133                        | 1,005                                 | 12,138                                 |
|          |                                       | 95   | 44,036                     | 10                              | 0                            | 0                       | 44,046                        | 1,255                                 | 45,301                                 |
|          |                                       | 94   | 51,581                     | 0                               | 0                            | 0                       | 51,581                        | 1,505                                 | 53,086                                 |
|          |                                       | 88   | 77,877                     | 0                               | 0                            | 0                       | 77,877                        | 258,498                               | 336,375                                |
| 3825     | Instruments to Measure Electricity    | 96   | 1,007                      | 0                               | 0                            | 0                       | 1,007                         | 0                                     | 1,007                                  |
|          |                                       | 95   | 7,767                      | 0                               | 0                            | 0                       | 7,767                         | 0                                     | 7,767                                  |
|          |                                       | 94   | 19,302                     | 0                               | 0                            | 0                       | 19,302                        | 160                                   | 19,462                                 |
|          |                                       | 88   | 910,268                    | 0                               | 0                            | 0                       | 910,268                       | 46,816                                | 957,084                                |
| 3826     | Analytical Instruments                | 96   | 11,000                     | 0                               | 0                            | 0                       | 11,000                        | 0                                     | 11,000                                 |
|          |                                       | 95   | 12,750                     | 0                               | 0                            | 0                       | 12,750                        | 0                                     | 12,750                                 |
|          |                                       | 94   | 21,250                     | 0                               | 0                            | 0                       | 21,250                        | 0                                     | 21,250                                 |
|          |                                       | 88   | 138,350                    | 0                               | 0                            | 0                       | 138,350                       | 6,978                                 | 145,328                                |
| 3827     | Optical Instruments & Lenses          | 96   | 54,439                     | 810                             | 0                            | 0                       | 55,249                        | 425,442                               | 480,691                                |
|          |                                       | 95   | 107,144                    | 64                              | 0                            | 0                       | 107,208                       | 135,768                               | 242,976                                |
|          |                                       | 94   | 68,634                     | 137                             | 0                            | 0                       | 68,771                        | 102,954                               | 171,725                                |
|          |                                       | 88   | 137,757                    | 0                               | 0                            | 0                       | 137,757                       | 75,700                                | 213,457                                |
| 3829     | Measuring & Controlling Devices, nec* | 96   | 138,014                    | 0                               | 0                            | 0                       | 138,014                       | 0                                     | 138,014                                |
|          |                                       | 95   | 165,075                    | 0                               | 0                            | 0                       | 165,075                       | 0                                     | 165,075                                |
|          |                                       | 94   | 57,871                     | 0                               | 0                            | 0                       | 57,871                        | 0                                     | 57,871                                 |
|          |                                       | 88   | 1,259,704                  | 3                               | 0                            | 0                       | 1,259,707                     | 28,524                                | 1,288,231                              |
| 3841     | Surgical & Medical Instruments        | 96   | 752,815                    | 6                               | 0                            | 260                     | 753,081                       | 15,901                                | 768,982                                |
|          |                                       | 95   | 1,289,094                  | 6                               | 0                            | 5                       | 1,289,105                     | 130,450                               | 1,419,555                              |
|          |                                       | 94   | 1,348,017                  | 263                             | 0                            | 10                      | 1,348,290                     | 76,844                                | 1,425,134                              |
|          |                                       | 88   | 5,365,785                  | 1,558                           | 0                            | 0                       | 5,367,343                     | 219,067                               | 5,586,410                              |
| 3842     | Surgical Appliances & Supplies        | 96   | 160,278                    | 0                               | 0                            | 0                       | 160,278                       | 13,061                                | 173,339                                |
|          |                                       | 95   | 168,498                    | 0                               | 0                            | 0                       | 168,498                       | 12,570                                | 181,068                                |
|          |                                       | 94   | 292,241                    | 3                               | 0                            | 404                     | 292,648                       | 10,438                                | 303,086                                |
|          |                                       | 88   | 1,454,143                  | 0                               | 0                            | 0                       | 1,454,143                     | 119,928                               | 1,574,071                              |
| 3843     | Dental Equipment & Supplies           | 96   | 31,275                     | 0                               | 0                            | 0                       | 31,275                        | 5,450                                 | 36,725                                 |
|          |                                       | 95   | 51,647                     | 0                               | 0                            | 0                       | 51,647                        | 3,150                                 | 54,797                                 |
|          |                                       | 94   | 93,227                     | 0                               | 0                            | 0                       | 93,227                        | 3,550                                 | 96,777                                 |
|          |                                       | 88   | 252,458                    | 0                               | 0                            | 0                       | 252,458                       | 3,150                                 | 255,608                                |

**Note:** On-site Releases from Section 5 of Form R and Off-site Releases from Section 6 (transfers off-site to disposal) of Form R. Forms with more than one 4-digit SIC code within SIC code 38 are assigned to the "multiple" category. One facility incorrectly reported 2,348,655 pounds of transfers off-site to disposal for 1988 under SIC code 3861. The correct amount is 0 pounds.

\*nec: not elsewhere classified.



## Chapter 15 — TRI Data for Instruments and Photographic Equipment

**Table 15-14. TRI On-site and Off-site Releases by 4-digit SIC Code, 1988 and 1994-1996: Instruments and Photographic Equipment, SIC Code 38, Continued**

| SIC Code | Industry                            | Year | On-site Releases              |                                    |                                 |                            | Total On-site Releases<br>Pounds | Off-site Releases                        | Total On- and Off-site Releases<br>Pounds |
|----------|-------------------------------------|------|-------------------------------|------------------------------------|---------------------------------|----------------------------|----------------------------------|--|---|
|          |                                     |      | Total Air Emissions<br>Pounds | Surface Water Discharges<br>Pounds | Underground Injection<br>Pounds | Releases to Land<br>Pounds |                                  | Transfers Off-site to Disposal<br>Pounds |   |
| 3844     | X-ray Apparatus & Tubes             | 96   | 26,919                        | 23                                 | 0                               | 0                          | 26,942                           | 11,910                                   | 38,852                                    |
|          |                                     | 95   | 43,887                        | 18                                 | 0                               | 0                          | 43,905                           | 0  | 43,905                                    |
|          |                                     | 94   | 29,786                        | 0                                  | 0                               | 0                          | 29,786                           | 250                                      | 30,036                                    |
|          |                                     | 88   | No reports received           |                                    |                                 |                            |                                  |  |   |
| 3845     | Electromedical Equipment            | 96   | 9,702                         | 0                                  | 0                               | 0                          | 9,702                            | 7,100                                    | 16,802                                    |
|          |                                     | 95   | 76,687                        | 0                                  | 0                               | 0                          | 76,687                           | 9,109                                    | 85,796                                    |
|          |                                     | 94   | 86,071                        | 0                                  | 0                               | 0                          | 86,071                           | 12,841                                   | 98,912                                    |
|          |                                     | 88   | 303,114                       | 0                                  | 0                               | 0                          | 303,114                          | 9,652                                    | 312,766                                   |
| 3851     | Ophthalmic Goods                    | 96   | 275,975                       | 0                                  | 0                               | 0                          | 275,975                          | 48,258                                   | 324,233                                   |
|          |                                     | 95   | 351,338                       | 0                                  | 0                               | 0                          | 351,338                          | 55,753                                   | 407,091                                   |
|          |                                     | 94   | 406,048                       | 0                                  | 0                               | 0                          | 406,048                          | 58,789                                   | 464,837                                   |
|          |                                     | 88   | 1,350,110                     | 0                                  | 0                               | 0                          | 1,350,110                        | 92,059                                   | 1,442,169                                 |
| 3861     | Photographic Equipment & Supplies   | 96   | 7,015,141                     | 262,981                            | 0                               | 1,146                      | 7,279,268                        | 188,351                                  | 7,467,619                                 |
|          |                                     | 95   | 8,501,166                     | 248,669                            | 0                               | 2,736                      | 8,752,571                        | 312,493                                  | 9,065,064                                 |
|          |                                     | 94   | 8,814,427                     | 319,055                            | 0                               | 3,865                      | 9,137,347                        | 407,238                                  | 9,544,585                                 |
|          |                                     | 88   | 28,049,045                    | 387,493                            | 250                             | 159,540                    | 28,596,328                       | 9,613,808                                | 38,210,136                                |
| 3873     | Watches, Clocks, Watchcases & Parts | 96   | 26,500                        | 0                                  | 0                               | 0                          | 26,500                           | 0  | 26,500                                    |
|          |                                     | 95   | 23,415                        | 0                                  | 0                               | 0                          | 23,415                           | 0  | 23,415                                    |
|          |                                     | 94   | 36,120                        | 0                                  | 0                               | 0                          | 36,120                           | 0  | 36,120                                    |
|          |                                     | 88   | 333,733                       | 0                                  | 0                               | 250                        | 333,983                          | 250                                      | 334,233                                   |
|          | Multiple within SIC Code 38         | 96   | 97,338                        | 280                                | 0                               | 0                          | 97,618                           | 6,335                                    | 103,953                                   |
|          |                                     | 95   | 126,718                       | 260                                | 0                               | 0                          | 126,978                          | 10,232                                   | 137,210                                   |
|          |                                     | 94   | 124,728                       | 20                                 | 0                               | 0                          | 124,748                          | 9,927                                    | 134,675                                   |
|          |                                     | 88   | 1,015,631                     | 0                                  | 0                               | 500                        | 1,016,131                        | 79,420                                   | 1,095,551                                 |
|          | Invalid SIC Code within SIC Code 38 | 96   | No reports received           |                                    |                                 |                            |                                  |  |   |
|          |                                     | 95   | 6,340                         | 0                                  | 0                               | 0                          | 6,340                            | 0  | 6,340                                     |
|          |                                     | 94   | 111,959                       | 0                                  | 0                               | 0                          | 111,959                          | 5,925                                    | 117,884                                   |
|          |                                     | 88   | 1,920,565                     | 501                                | 0                               | 0                          | 1,921,066                        | 63,615                                   | 1,984,681                                 |
|          | Total for SIC Code 38               | 96   | 9,298,517                     | 264,207                            | 0                               | 2,527                      | 9,565,251                        | 793,368                                  | 10,358,619                                |
|          |                                     | 95   | 11,917,203                    | 249,173                            | 0                               | 5,766                      | 12,172,142                       | 783,071                                  | 12,955,213                                |
|          |                                     | 94   | 13,192,730                    | 319,552                            | 0                               | 7,074                      | 13,519,356                       | 808,871                                  | 14,328,227                                |
|          |                                     | 88   | 46,478,774                    | 390,382                            | 250                             | 340,403                    | 47,209,809                       | 10,875,015                               | 58,084,824                                |

**Note:** **On-site Releases** from Section 5 of Form R and **Off-site Releases** from Section 6 (transfers off-site to disposal) of Form R. Forms with more than one 4-digit SIC code within SIC code 38 are assigned to the "multiple" category. One facility incorrectly reported 2,348,655 pounds of transfers off-site to disposal for 1988 under SIC code 3861. The correct amount is 0 pounds.

\***nec:** not elsewhere classified.



**Table 15-15. TRI Other On-site Waste Management by 4-digit SIC Code, 1988 and 1994-1996: Instruments and Photographic Equipment, SIC Code 38**

| SIC Code | Industry                              | Year | Recycled On-site Pounds | Energy Recovery On-site Pounds | Treated On-site Pounds | Total Other On-site Waste Management Pounds |
|----------|---------------------------------------|------|-------------------------|--------------------------------|------------------------|---|
| 3812     | Search & Navigation Equipment         | 96   | 47,900                  | 0                              | 3,800                  | 51,700                                      |
|          |                                       | 95   | 163,341                 | 0                              | 12,601                 | 175,942                                     |
|          |                                       | 94   | 384,665                 | 0                              | 13,001                 | 397,666                                     |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |
| 3821     | Laboratory Apparatus & Furniture      | 96   | 0                       | 0                              | 0                      | 0   |
|          |                                       | 95   | 13,000                  | 0                              | 0                      | 13,000                                      |
|          |                                       | 94   | 0                       | 0                              | 1                      | 1   |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |
| 3822     | Environmental Controls                | 96   | 44,905                  | 0                              | 5,265                  | 50,170                                      |
|          |                                       | 95   | 16,431                  | 0                              | 5,120                  | 21,551                                      |
|          |                                       | 94   | 64,503                  | 0                              | 6,500                  | 71,003                                      |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |
| 3823     | Process Control Instruments           | 96   | 0                       | 0                              | 60                     | 60  |
|          |                                       | 95   | 0                       | 0                              | 12,462                 | 12,462                                      |
|          |                                       | 94   | 145,039                 | 0                              | 12,986                 | 158,025                                     |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |
| 3824     | Fluid Meters & Counting Devices       | 96   | 0                       | 0                              | 0                      | 0   |
|          |                                       | 95   | 0                       | 0                              | 0                      | 0   |
|          |                                       | 94   | 0                       | 0                              | 0                      | 0   |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |
| 3825     | Instruments to Measure Electricity    | 96   | 0                       | 0                              | 27,471                 | 27,471                                      |
|          |                                       | 95   | 0                       | 0                              | 29,241                 | 29,241                                      |
|          |                                       | 94   | 0                       | 0                              | 30,904                 | 30,904                                      |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |
| 3826     | Analytical Instruments                | 96   | 0                       | 0                              | 0                      | 0   |
|          |                                       | 95   | 0                       | 0                              | 0                      | 0   |
|          |                                       | 94   | 0                       | 0                              | 12,000                 | 12,000                                      |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |
| 3827     | Optical Instruments & Lenses          | 96   | 30,372                  | 0                              | 0                      | 30,372                                      |
|          |                                       | 95   | 27,947                  | 0                              | 0                      | 27,947                                      |
|          |                                       | 94   | 23,872                  | 0                              | 0                      | 23,872                                      |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |
| 3829     | Measuring & Controlling Devices, nec* | 96   | 24,448                  | 0                              | 0                      | 24,448                                      |
|          |                                       | 95   | 26,048                  | 0                              | 0                      | 26,048                                      |
|          |                                       | 94   | 458,784                 | 0                              | 2                      | 458,786                                     |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |
| 3841     | Surgical & Medical Instruments        | 96   | 502,986                 | 0                              | 2,817,648              | 3,320,634                                   |
|          |                                       | 95   | 502,751                 | 0                              | 2,816,485              | 3,319,236                                   |
|          |                                       | 94   | 439,123                 | 0                              | 1,680,932              | 2,120,055                                   |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |
| 3842     | Surgical Appliances & Supplies        | 96   | 45,224                  | 0                              | 860,738                | 905,962                                     |
|          |                                       | 95   | 3,819                   | 0                              | 762,898                | 766,717                                     |
|          |                                       | 94   | 42,433                  | 0                              | 1,470,971              | 1,513,404                                   |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |

**Note:** Data from Section 8 of Form R. Forms with more than one 4-digit SIC code within SIC code 38 are assigned to the "multiple" category.

\*nec: not elsewhere classified.



## Chapter 15 — TRI Data for Instruments and Photographic Equipment

**Table 15-15. TRI Other On-site Waste Management by 4-digit SIC Code, 1988 and 1994-1996: Instruments and Photographic Equipment, SIC Code 38, Continued**

| SIC Code | Industry                            | Year | Recycled On-site Pounds | Energy Recovery On-site Pounds | Treated On-site Pounds | Total Other On-site Waste Management Pounds |
|----------|-------------------------------------|------|-------------------------|--------------------------------|------------------------|---|
| 3843     | Dental Equipment & Supplies         | 96   | 0                       | 0                              | 1,385                  | 1,385                                       |
|          |                                     | 95   | 19,320                  | 0                              | 512                    | 19,832                                      |
|          |                                     | 94   | 31,330                  | 0                              | 700                    | 32,030                                      |
|          |                                     | 88   | NA                      | NA                             | NA                     | NA  |
| 3843     | Dental Equipment & Supplies         | 96   | 0                       | 0                              | 1,385                  | 1,385                                       |
|          |                                     | 95   | 19,320                  | 0                              | 512                    | 19,832                                      |
|          |                                     | 94   | 31,330                  | 0                              | 700                    | 32,030                                      |
|          |                                     | 88   | NA                      | NA                             | NA                     | NA  |
| 3844     | X-ray Apparatus & Tubes             | 96   | 2,179                   | 0                              | 18,081                 | 20,260                                      |
|          |                                     | 95   | 2,800                   | 0                              | 12,016                 | 14,816                                      |
|          |                                     | 94   | 0                       | 0                              | 0                      | 0   |
|          |                                     | 88   | No reports received     |                                |                        |   |
| 3845     | Electromedical Equipment            | 96   | 0                       | 0                              | 21,000                 | 21,000                                      |
|          |                                     | 95   | 5,790                   | 0                              | 22,000                 | 27,790                                      |
|          |                                     | 94   | 0                       | 0                              | 22,000                 | 22,000                                      |
|          |                                     | 88   | NA                      | NA                             | NA                     | NA  |
| 3851     | Ophthalmic Goods                    | 96   | 50,657                  | 0                              | 4,870                  | 55,527                                      |
|          |                                     | 95   | 40,237                  | 0                              | 4,969                  | 45,206                                      |
|          |                                     | 94   | 72,571                  | 0                              | 8,620                  | 81,191                                      |
|          |                                     | 88   | NA                      | NA                             | NA                     | NA  |
| 3861     | Photographic Equipment & Supplies   | 96   | 2,642,765               | 683,500                        | 31,577,693             | 34,903,958                                  |
|          |                                     | 95   | 3,542,785               | 610,500                        | 30,871,104             | 35,024,389                                  |
|          |                                     | 94   | 1,840,886               | 683,300                        | 26,660,355             | 29,184,541                                  |
|          |                                     | 88   | NA                      | NA                             | NA                     | NA  |
| 3873     | Watches, Clocks, Watchcases & Parts | 96   | 11,100                  | 0                              | 15,026                 | 26,126                                      |
|          |                                     | 95   | 9,200                   | 0                              | 18,928                 | 28,128                                      |
|          |                                     | 94   | 11,600                  | 0                              | 0                      | 11,600                                      |
|          |                                     | 88   | NA                      | NA                             | NA                     | NA  |
|          | Multiple within SIC Code 38         | 96   | 13,560                  | 0                              | 291,948                | 305,508                                     |
|          |                                     | 95   | 15,045                  | 0                              | 229,737                | 244,782                                     |
|          |                                     | 94   | 28,300                  | 0                              | 191,598                | 219,898                                     |
|          |                                     | 88   | NA                      | NA                             | NA                     | NA  |
|          | Invalid SIC Code within SIC Code 38 | 96   | No reports received     |                                |                        |   |
|          |                                     | 95   | 6,000                   | 0                              | 0                      | 6,000                                       |
|          |                                     | 94   | 2,300                   | 0                              | 0                      | 2,300                                       |
|          |                                     | 88   | NA                      | NA                             | NA                     | NA  |
|          | Total for SIC Code 38               | 96   | 3,416,096               | 683,500                        | 35,644,985             | 39,744,581                                  |
|          |                                     | 95   | 4,394,514               | 610,500                        | 34,798,073             | 39,803,087                                  |
|          |                                     | 94   | 3,545,406               | 683,300                        | 30,110,570             | 34,339,276                                  |
|          |                                     | 88   | NA                      | NA                             | NA                     | NA  |

**Note:** Data from Section 8 of Form R. Forms with more than one 4-digit SIC code within SIC code 38 are assigned to the "multiple" category.

**\*nec:** not elsewhere classified.





The process control instruments industry (SIC code 3823) reported the sector's largest increase in transfers off-site for further waste management. This industry reported 446,000 pounds in 1994 and 554,000 pounds in 1996. Ranking second, the x-ray apparatus and tubes industry (SIC code 3844) reported an increase from 103,000 pounds to 180,000 pounds. For both industries, the increase was attributable to transfers to recycling. The optical instruments and lenses industry (SIC code 3827) ranked third, reporting 26,000 pounds in 1994 and 93,000 pounds in 1996, principally in transfers to treatment.

Table 15-16 presents the sector's transfers off-site for further waste management for 1988-1996.

#### *Facilities with Large Increases and Decreases in Releases, 1988-1996*

Morton International, Inc., in New Iberia, Louisiana (did not report in 1988, SIC code 3827 in 1996), was the top increaser in releases with 215,000 pounds. The facility did not begin operation until after the 1988 reporting year. Therefore, the total releases for 1996 equal the overall increase. Zinc compounds accounted for 75% of the 1996 release reporting. The facility contacts did not comment on the type of products manufactured or how zinc compounds are used. SIC code 3827 represents optical instruments and lenses.

White Rogers Div. Batesville in Batesville, Arkansas (SIC code 3822), was second with an overall increase of 190,000 pounds between 1988 and 1996. The facility manufactures natural gas valves for residential applications. Trichloroethylene (TCE) accounted for 84% of the total increase in reporting. The facility reported no releases for the chemical in 1988 and reported 160,000 pounds of air emissions in 1996. TCE replaced 1,1,1-trichloroethane (TCA) in a solvent vapor degreasing system prior to the 1996 reporting year. Conversely, the facility reported data for TCA in 1988 but not in 1996. The ranking as an increaser in releases is due to a change in air

emissions estimation methodology, the result being that the decrease in TCA reporting did not equal the increase in TCE reporting. The facility contact stated that by early 1999, the solvent vapor degreasing system will be fully phased-out and replaced by an aqueous cleaning system.

Mita South Carolina, Inc., in Fountain Inn, South Carolina (did not report in 1988, SIC code 3861 in 1996), ranked third in increases with a total 124,000 pounds. Styrene reporting accounted for 71% of the total increase. Proprietary toner formulations for the photocopier industry are manufactured at this facility. Granular styrene resins are used as a toner constituent. The facility did not begin operation until 1992. Consequently, the total releases for the 1996 reporting year equal the total increase between 1988 and 1996.

Eastman Kodak Company in Rochester, New York (SIC code 3861), was the top decreaser in releases with a 13.4 million-pound reduction between 1988 and 1996. A reduction in dichloromethane reporting accounted for 50% of the facility's overall decrease. The chemical is used as a solvent in the production of acetate film-base. In addition to film and photographic paper, the plant also manufactures synthetic organic chemicals used in photographic products. The facility contact attributed the decrease to greater process efficiency and the installation of pollution control devices. This facility also ranked second for decreases in waste management (see "Facilities with Large Increases and Decreases in Waste Management, 1991-1996").

Du Pont in Towanda, Pennsylvania (SIC code 3861), ranked second in decreases with 7.4 million pounds. The facility manufactures coated film products used in electronics, printing and publishing, and medical industries. Dichloromethane, a solvent in coating and cleaning operations, accounted for 96% of the reported decrease. The facility contact cited improvements in pollution control technology as the primary



## Chapter 15 — TRI Data for Instruments and Photographic Equipment

**Table 15-16. TRI Transfers Off-site for Further Waste Management by 4-digit SIC Code, 1988 and 1994-1996: Instruments and Photographic Equipment, SIC Code 38**

| SIC Code | Industry                              | Year | Transfers to Recycling Pounds | Transfers to Energy Recovery Pounds | Transfers to Treatment Pounds | Transfers to POTWs Pounds | Other Off-site Transfers Pounds | Total Transfers Off-site for Further Waste Management Pounds |
|----------|---------------------------------------|------|-------------------------------|-------------------------------------|-------------------------------|---------------------------|---------------------------------|--|
| 3812     | Search & Navigation Equipment         | 96   | 30,655                        | 0                                   | 22,618                        | 250                       | 0                               | 53,523   |
|          |                                       | 95   | 33,025                        | 13,356                              | 66,023                        | 270                       | 0                               | 112,674  |
|          |                                       | 94   | 290,032                       | 17,724                              | 65,853                        | 20,067                    | 0                               | 393,676  |
|          |                                       | 88   | NA                            | NA                                  | 456,343                       | 79,721                    | 4,300                           | NA   |
| 3821     | Laboratory Apparatus & Furniture      | 96   | 44,938                        | 67,349                              | 1,000                         | 14,080                    | 0                               | 127,367  |
|          |                                       | 95   | 69,095                        | 152,127                             | 6,060                         | 13,020                    | 0                               | 240,302  |
|          |                                       | 94   | 121,992                       | 124,879                             | 3,850                         | 11,020                    | 0                               | 261,741  |
|          |                                       | 88   | NA                            | NA                                  | 85,619                        | 510                       | 0                               | NA   |
| 3822     | Environmental Controls                | 96   | 3,963,356                     | 4,506                               | 47,551                        | 1,069                     | 0                               | 4,016,482  |
|          |                                       | 95   | 3,883,697                     | 18,898                              | 56,799                        | 1,857                     | 0                               | 3,961,251  |
|          |                                       | 94   | 4,563,757                     | 27,665                              | 94,531                        | 1,776                     | 0                               | 4,687,729  |
|          |                                       | 88   | NA                            | NA                                  | 255,619                       | 9,510                     | 11,122                          | NA   |
| 3823     | Process Control Instruments           | 96   | 550,370                       | 4,101                               | 0                             | 15                        | 0                               | 554,486  |
|          |                                       | 95   | 426,582                       | 9,671                               | 10,524                        | 2,360                     | 0                               | 449,137  |
|          |                                       | 94   | 417,646                       | 11,007                              | 15,983                        | 1,729                     | 0                               | 446,365  |
|          |                                       | 88   | NA                            | NA                                  | 123,625                       | 515                       | 23,249                          | NA   |
| 3824     | Fluid Meters & Counting Devices       | 96   | 359,551                       | 0                                   | 124                           | 359                       | 0                               | 360,034  |
|          |                                       | 95   | 725,429                       | 728                                 | 595                           | 505                       | 0                               | 727,257  |
|          |                                       | 94   | 695,644                       | 387                                 | 5,554                         | 750                       | 0                               | 702,335  |
|          |                                       | 88   | NA                            | NA                                  | 7,750                         | 500                       | 350                             | NA   |
| 3825     | Instruments to Measure Electricity    | 96   | 31,475                        | 0                                   | 254                           | 750                       | 0                               | 32,479   |
|          |                                       | 95   | 83,455                        | 0                                   | 0                             | 750                       | 0                               | 84,205   |
|          |                                       | 94   | 102,980                       | 0                                   | 0                             | 250                       | 0                               | 103,230  |
|          |                                       | 88   | NA                            | NA                                  | 45,600                        | 176,871                   | 0                               | NA   |
| 3826     | Analytical Instruments                | 96   | 0                             | 22,200                              | 0                             | 20,000                    | 0                               | 42,200   |
|          |                                       | 95   | 0                             | 32,900                              | 9,250                         | 17,700                    | 0                               | 59,850   |
|          |                                       | 94   | 0                             | 34,900                              | 15,000                        | 29,000                    | 0                               | 78,900   |
|          |                                       | 88   | NA                            | NA                                  | 25,980                        | 16,650                    | 0                               | NA   |
| 3827     | Optical Instruments & Lenses          | 96   | 12,496                        | 20,683                              | 59,750                        | 250                       | 0                               | 93,179   |
|          |                                       | 95   | 11,989                        | 20,892                              | 4,433                         | 250                       | 0                               | 37,564   |
|          |                                       | 94   | 10,741                        | 13,984                              | 692                           | 250                       | 0                               | 25,667   |
|          |                                       | 88   | NA                            | NA                                  | 10,950                        | 0                         | 0                               | NA   |
| 3829     | Measuring & Controlling Devices, nec* | 96   | 68,538                        | 8,804                               | 58                            | 11                        | 0                               | 77,411   |
|          |                                       | 95   | 72,622                        | 0                                   | 1,962                         | 21                        | 0                               | 74,605   |
|          |                                       | 94   | 61,152                        | 0                                   | 55                            | 7                         | 0                               | 61,214   |
|          |                                       | 88   | NA                            | NA                                  | 76,408                        | 67,520                    | 41,791                          | NA   |
| 3841     | Surgical & Medical Instruments        | 96   | 1,371,026                     | 46,246                              | 51,042                        | 97,243                    | 44,588                          | 1,610,145  |
|          |                                       | 95   | 917,985                       | 61,766                              | 190,070                       | 94,834                    | 0                               | 1,264,655  |
|          |                                       | 94   | 1,346,956                     | 60,562                              | 323,733                       | 83,587                    | 0                               | 1,814,838  |
|          |                                       | 88   | NA                            | NA                                  | 489,294                       | 107,717                   | 16,539                          | NA   |
| 3842     | Surgical Appliances & Supplies        | 96   | 926,136                       | 0                                   | 34,460                        | 181,756                   | 0                               | 1,142,352  |
|          |                                       | 95   | 879,506                       | 27,481                              | 15,495                        | 242,046                   | 0                               | 1,164,528  |
|          |                                       | 94   | 913,638                       | 62,788                              | 39,785                        | 276,159                   | 0                               | 1,292,370  |
|          |                                       | 88   | NA                            | NA                                  | 197,759                       | 257,225                   | 10,823                          | NA   |
| 3843     | Dental Equipment & Supplies           | 96   | 101,451                       | 4,650                               | 0                             | 25,000                    | 0                               | 131,101  |
|          |                                       | 95   | 143,220                       | 6,304                               | 750                           | 1,250                     | 0                               | 151,524  |
|          |                                       | 94   | 53,163                        | 11,023                              | 4,430                         | 755                       | 0                               | 69,371   |
|          |                                       | 88   | NA                            | NA                                  | 72,311                        | 29,317                    | 0                               | NA   |

**Note: Transfers Off-site for Further Waste Management** from Section 6 (excluding transfers off-site to disposal) of Form R. Other Off-site Transfers are transfers reported without a valid waste management code. Forms with more than one 4-digit SIC code within SIC code 38 are assigned to the "multiple" category.

\*nec: not elsewhere classified.



**Table 15-16. TRI Transfers Off-site for Further Waste Management by 4-digit SIC Code, 1988 and 1994-1996: Instruments and Photographic Equipment, SIC Code 38, Continued**

| SIC Code | Industry                            | Year | Transfers to Recycling Pounds | Transfers to Energy Recovery Pounds | Transfers to Treatment Pounds | Transfers to POTWs Pounds | Other Off-site Transfers Pounds | Total Transfers Off-site for Further Waste Management Pounds |
|----------|-------------------------------------|------|-------------------------------|-------------------------------------|-------------------------------|---------------------------|---------------------------------|--|
| 3844     | X-ray Apparatus & Tubes             | 96   | 176,956                       | 0                                   | 3,369                         | 20                        | 0                               | 180,345  |
|          |                                     | 95   | 133,082                       | 7,100                               | 29,699                        | 57                        | 0                               | 169,938  |
|          |                                     | 94   | 94,810                        | 0                                   | 8,610                         | 5                         | 0                               | 103,425  |
|          |                                     | 88   | No reports received           |                                     |                               |                           |                                 |  |
| 3845     | Electromedical Equipment            | 96   | 91,782                        | 1,920                               | 720                           | 0                         | 0                               | 94,422   |
|          |                                     | 95   | 90,138                        | 2,720                               | 9,070                         | 5                         | 0                               | 101,933  |
|          |                                     | 94   | 85,787                        | 4,800                               | 9,300                         | 0                         | 0                               | 99,887   |
|          |                                     | 88   | NA                            | NA                                  | 0                             | 76,510                    | 0                               | NA   |
| 3851     | Ophthalmic Goods                    | 96   | 263,856                       | 89,392                              | 52,377                        | 5,837                     | 0                               | 411,462  |
|          |                                     | 95   | 252,326                       | 97,895                              | 35,168                        | 49,142                    | 0                               | 434,531  |
|          |                                     | 94   | 267,096                       | 166,247                             | 85,991                        | 70,292                    | 0                               | 589,626  |
|          |                                     | 88   | NA                            | NA                                  | 182,455                       | 141,514                   | 1,290                           | NA   |
| 3861     | Photographic Equipment & Supplies   | 96   | 3,481,494                     | 1,998,344                           | 1,686,655                     | 115,514                   | 0                               | 7,282,007  |
|          |                                     | 95   | 6,038,028                     | 1,791,638                           | 2,550,319                     | 85,443                    | 0                               | 10,465,428   |
|          |                                     | 94   | 5,170,388                     | 2,517,973                           | 3,419,272                     | 122,870                   | 0                               | 11,230,503   |
|          |                                     | 88   | NA                            | NA                                  | 4,311,813                     | 1,229,940                 | 79,657                          | NA   |
| 3873     | Watches, Clocks, Watchcases & Parts | 96   | 250                           | 0                                   | 5,400                         | 0                         | 0                               | 5,650  |
|          |                                     | 95   | 0                             | 0                                   | 5,038                         | 0                         | 0                               | 5,038  |
|          |                                     | 94   | 4,509                         | 0                                   | 4,640                         | 0                         | 0                               | 9,149  |
|          |                                     | 88   | NA                            | NA                                  | 73,221                        | 538                       | 0                               | NA   |
|          | Multiple within SIC Code 38         | 96   | 395,454                       | 26,108                              | 57,210                        | 36,542                    | 0                               | 515,314  |
|          |                                     | 95   | 344,260                       | 32,764                              | 46,210                        | 48,539                    | 0                               | 471,773  |
|          |                                     | 94   | 290,093                       | 29,071                              | 69,355                        | 77,227                    | 0                               | 465,746  |
|          |                                     | 88   | NA                            | NA                                  | 172,075                       | 15,455                    | 0                               | NA   |
|          | Invalid SIC Code within SIC Code 38 | 96   | No reports received           |                                     |                               |                           |                                 |  |
|          |                                     | 95   | 4,200                         | 1,805                               | 18,000                        | 0                         | 0                               | 24,005   |
|          |                                     | 94   | 11,850                        | 1,255                               | 15,060                        | 0                         | 0                               | 28,165   |
|          |                                     | 88   | NA                            | NA                                  | 238,597                       | 57,393                    | 7,500                           | NA   |
|          | Total for SIC Code 38               | 96   | 11,869,784                    | 2,294,303                           | 2,022,588                     | 498,696                   | 44,588                          | 16,729,959   |
|          |                                     | 95   | 14,108,639                    | 2,278,045                           | 3,055,465                     | 558,049                   | 0                               | 20,000,198   |
|          |                                     | 94   | 14,502,234                    | 3,084,265                           | 4,181,694                     | 695,744                   | 0                               | 22,463,937   |
|          |                                     | 88   | NA                            | NA                                  | 6,825,419                     | 2,267,406                 | 196,621                         | NA   |

**Note:** Transfers Off-site for Further Waste Management from Section 6 (excluding transfers off-site to disposal) of Form R. Other Off-site Transfers are transfers reported without a valid waste management code. Forms with more than one 4-digit SIC code within SIC code 38 are assigned to the "multiple" category.

\***nec:** not elsewhere classified.

reason for the reduction. Since the 1996 reporting year, dichloromethane has been eliminated altogether through process substitutions.

Anitec International Paper in Binghamton, New York (SIC code 3861), was third in decreases with 2.7 million pounds. The facility ran film and photographic paper coating operations and manufactured film-base and photographic chemical

processing solutions. Dichloromethane, used in the production of film-base, was responsible for 67% of the facility's reduction. The facility reported no releases of the chemical in 1996. The processes in which dichloromethane was used was shut down in late 1991 due to a declining market. One reason cited for this was the growing popularity of desk-top computer graphics imaging. This facility was also third in decreases of production-related waste



from 1991 to 1996. See “Facilities with Large Increases and Decreases in Waste Management, 1991-1996,” for more information.

### **Other Apparent Increases and Decreases in Releases, 1988-1996**

In the TRI database, there are other facilities with large apparent increases and decreases, which have been identified as reporting errors or plant closures. Because these are errors or plant closures and not actual changes in the data, these facilities are not discussed in detail here. There is one such facility in the instruments and photographic equipment sector:

Xerox Corporation, Oklahoma City, Oklahoma, decrease of 3.1 million pounds, reporting error.

### **1991-1996 Waste Management Data for Instruments and Photographic Equipment**

Table 15-17 summarizes on- and off-site waste management data for the instruments and photographic equipment sector for 1991, when TRI began collecting this information, and the three most recent years (1994-1996). The sector reported a 41.5% reduction in total production-related waste, from 115.0 million pounds in 1991 to 67.3 million pounds in 1996. The largest factor in this 47.7 million-pound reduction was a reduction in quantities released on- and off-site from 35.8 million pounds to 10.4 million pounds. This represented a 71.0% reduction in quantities released. The sector also reported an 86.3% reduction in on-site recycling, from 25.1 million pounds to 3.5 million pounds.

Reporting of all types of off-site waste management decreased from 1991 to 1996: recycling from 16.4 million pounds to 12.3 million pounds, energy recovery from 3.4 million pounds to 2.4 million pounds, and treatment from 4.4 million pounds to 2.5 million pounds. These represented percentage

decreases ranging from 25.0% to 43.5%. As noted earlier, one facility in the photographic equipment industry (SIC code 3861) reported a 3.0 million-pound increase in on-site treatment of methanol from 1994 to 1995.

The instruments and photographic equipment sector reported increases in on-site treatment (from 29.6 million pounds to 35.6 million pounds) and on-site energy recovery (from 269,000 pounds to 684,000 pounds). These were increases of 20.5% and 153.7%, respectively.

Figure 15-13 illustrates the percentage changes in waste management methods reported by the instruments and photographic equipment sector for 1991-1996.

The sector's changes in waste management amounts reported to TRI from 1991 to 1996 indicate progress in reducing the proportion of production-related waste that the sector releases to the environment. The sector reported cutting in half the proportion of its TRI chemicals in waste that it released from 1991 to 1996 (from about 30% to about 15% of total production-related waste). In terms of the waste management hierarchy (explained in Chapter 1), releases are the least desirable option for managing waste that cannot be prevented. Among other waste management options, however, treatment nearly doubled (from about 30% to 57% of production-related waste). Although this option is preferable to releases, it is less desirable than recycling or energy recovery. The sector reported less of its production-related waste as recycled over the 1991-1996 period, decreasing from 36% of production-related waste to 23%.

### **Facilities with Large Increases and Decreases in Waste Management, 1991-1996**

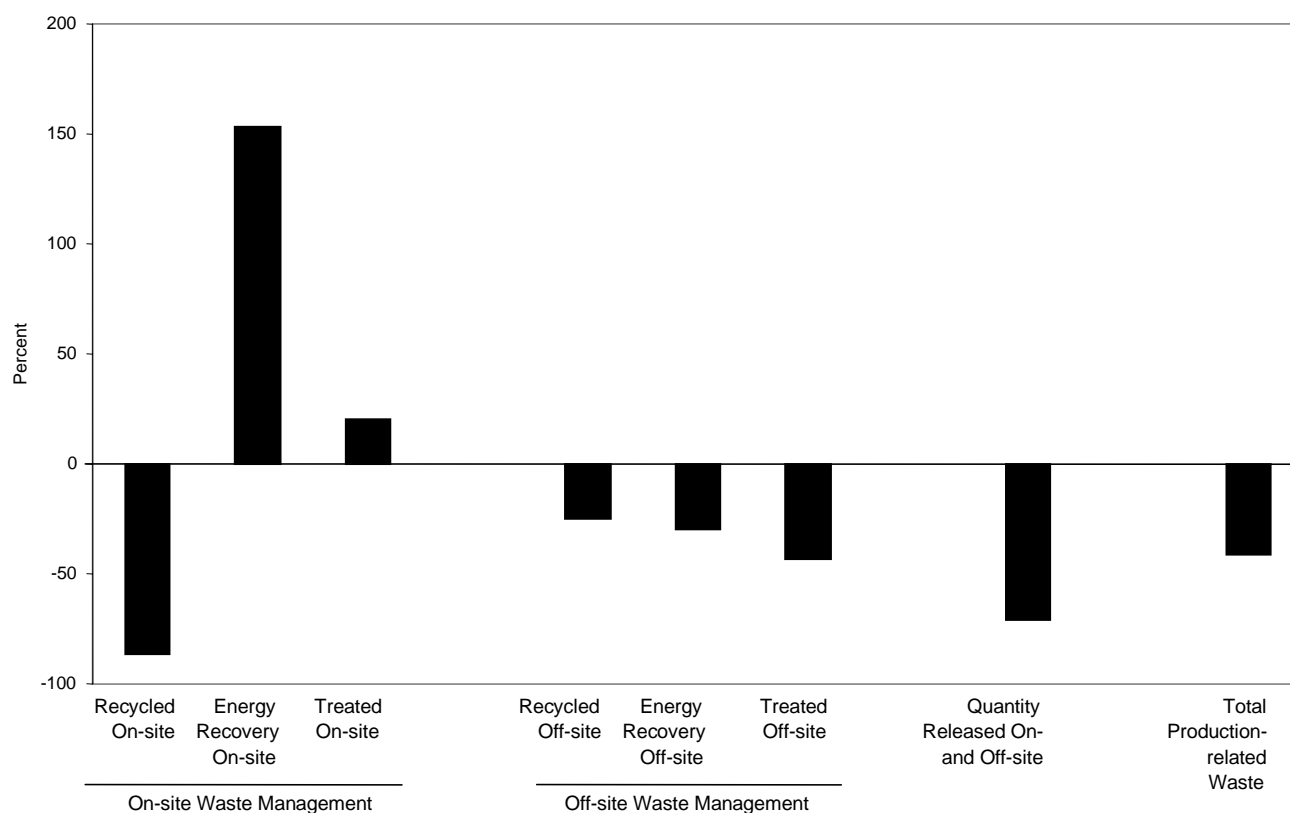
Polaroid Corporation in Assonet, Massachusetts (SIC code 3861 in 1991 and codes 2869 and 3861



Table 15-17. TRI Waste Management Data, 1991, 1994-1996: Instruments and Photographic Equipment, SIC Code 38

| Waste Management Activity          | 1991<br>Pounds                 | 1994<br>Pounds                 | 1995<br>Pounds                 | 1996<br>Pounds |
|------------------------------------|--------------------------------|--------------------------------|--------------------------------|----------------|
| <u>On-site Waste Management</u>    |                                |                                |                                |                |
| Recycled On-site                   | 25,138,826                     | 3,785,836                      | 4,485,631                      | 3,451,467      |
| Energy Recovery On-site            | 269,410                        | 683,300                        | 610,500                        | 683,500        |
| Treated On-site                    | 29,570,270                     | 30,301,062                     | 34,896,489                     | 35,645,001     |
| Total On-site Waste Management     | 54,978,506                     | 34,770,198                     | 39,992,620                     | 39,779,968     |
| <u>Off-site Waste Management</u>   |                                |                                |                                |                |
| Recycled Off-site                  | 16,393,801                     | 14,984,331                     | 14,279,633                     | 12,289,407     |
| Energy Recovery Off-site           | 3,369,208                      | 3,082,096                      | 2,277,865                      | 2,357,275      |
| Treated Off-site                   | 4,427,223                      | 4,854,522                      | 3,638,244                      | 2,500,605      |
| Total Off-site Waste Management    | 24,190,232                     | 22,920,949                     | 20,195,742                     | 17,147,287     |
| Quantity Released On- and Off-site | 35,794,261                     | 15,577,937                     | 13,569,171                     | 10,374,928     |
| Total Production-related Waste     | 114,962,999                    | 73,269,084                     | 73,757,533                     | 67,302,183     |
| Non-Production-related Waste       | 78,899                         | 4,915                          | 4,330                          | 139,891        |
| Waste Management Activity          | Change<br>1994-1995<br>Percent | Change<br>1995-1996<br>Percent | Change<br>1991-1996<br>Percent |                |
| <u>On-site Waste Management</u>    |                                |                                |                                |                |
| Recycled On-site                   | 18.5                           | -23.1                          | -86.3                          |                |
| Energy Recovery On-site            | -10.7                          | 12.0                           | 153.7                          |                |
| Treated On-site                    | 15.2                           | 2.1                            | 20.5                           |                |
| Total On-site Waste Management     | 15.0                           | -0.5                           | -27.6                          |                |
| <u>Off-site Waste Management</u>   |                                |                                |                                |                |
| Recycled Off-site                  | -4.7                           | -13.9                          | -25.0                          |                |
| Energy Recovery Off-site           | -26.1                          | 3.5                            | -30.0                          |                |
| Treated Off-site                   | -25.1                          | -31.3                          | -43.5                          |                |
| Total Off-site Waste Management    | -11.9                          | -15.1                          | -29.1                          |                |
| Quantity Released On- and Off-site | -12.9                          | -23.5                          | -71.0                          |                |
| Total Production-related Waste     | 0.7                            | -8.8                           | -41.5                          |                |
| Non-Production-related Waste       | -11.9                          | 3,130.7                        | 77.3                           |                |

**Note:** Does not include delisted chemicals, chemicals added in 1994 and 1995, ammonia, hydrochloric acid, and sulfuric acid. Data from Section 8 of Form R (Current Year, Column B) of year indicated.



**Figure 15-13. Percentage Change in Quantities of TRI Chemicals in Waste, 1991-1996: Instruments and Photographic Equipment (SIC Code 38)**

**Note:** Does not include delisted chemicals, chemicals added in 1994 and 1995, ammonia, hydrochloric acid, and sulfuric acid. Data from Section 8 of Form R (Current Year, Column B) of year indicated.

in 1996), was first in increases of waste managed with 761,000 pounds. The facility produces chemicals used in the manufacture of Polaroid™ film. Dichloromethane, used as a solvent, accounted for 85% of the increase. No data for dichloromethane were reported in 1991. According to the facility contact, a categorical discharge regulation for organic chemicals, plastics, and synthetic fibers came into effect in 1991. The facility was not equipped to meet the new discharge levels and ceased using some chemicals, including dichloromethane, during part of 1991 until upgrades were made to their wastewater treatment operations. Full-time operations in subsequent years account for the increase.

Polaroid Corporation in New Bedford, Massachusetts (SIC code 3861), ranked second in

increases with 729,000 pounds. This Polaroid facility, which manufactures medical imaging and graphic arts products, did not become operational until 1993. Therefore, there were no data reported in 1991. Methyl ethyl ketone data constituted 98% of the facility's 1996 waste management reporting. The chemical is used as a solvent in coating operations.

Azon Corporation in Johnson City, New York (SIC code 3861), was third in increases with 511,000 pounds. A manufacturer of diazo paper (e.g., blue-print paper), this facility uses methanol in a coating operation. The chemical was responsible for 38% of the overall increase. Two reasons were cited by the facility contact for the increase in methanol reporting: 1) another facility that ran coating operations was shut down and consolidated with



the Johnson City plant, and 2) most of the increase in methanol reporting was in on-site energy recovery—the facility added a boiler to its energy recovery system, thereby increasing the system’s capacity to utilize methanol as a fuel.

Anitec International Paper in Binghamton, New York (SIC code 3861), was the top facility for decreases in waste managed. On-site recycling of dichloromethane dropped from 8.5 million pounds in 1991 to zero in 1996. The facility recovered and reused over 90% of the chemical before its film-base manufacturing processes were shut down. See “Facilities with Large Increases and Decreases in Releases, 1988-1996,” for more information.

Eastman Kodak Company in Rochester, New York (SIC code 3861), was second in decreases with a 7.8 million-pound reduction. Dichloromethane waste management data decreased by 6.4 million pounds (82% of the overall decrease) between 1991 and 1996 at this photographic products manufacturing facility. The reporting category with the largest dichloromethane decrease was on-site recycling. This category dropped from 2.7 million pounds in 1991 to zero pounds in 1996. The facility contact cited a change in the interpretation of the recycling process as the reason.<sup>1</sup> This facility also ranked first for decreases in releases (see “Facilities with Large Increases and Decreases in Releases, 1988-1996”).

Du Pont in Towanda, Pennsylvania (SIC code 3861), was third with a 4.6 million-pound decrease. Decreases in dichloromethane waste management reporting accounted for 100% of the decrease. The facility also ranked as a major decreaser in releases (see “Facilities with Large Increases and Decreases in Releases, 1988-1996”). Dichloromethane was

used in cleaning and coating operations in the manufacture of coated film products. The chemical was phased-out by the end of 1996. Decreased usage prior to the chemical’s elimination resulted in the decrease.

#### **Facilities Contacted for Explanations (alphabetical by facility):**

Anitec International Paper, Binghamton, New York: Maureen Hoke and Alan Markle, September 22, 1998 (explanation provided)

Azon Corporation, Johnson City, New York: Roger Philpott, September 22, 1998 (explanation provided)

Du Pont, Towanda, Pennsylvania: Jim Hasse, September 17, 1998 (explanation provided)

Eastman Kodak Company, Rochester, New York: Steven Vaughn, September 21, 1998 and Eileen Criswell, September 22, 1998 (explanation provided)

Mita South Carolina, Inc., Fountain Inn, South Carolina: Fred Hartwig, September 21, 1998 (explanation provided)

Morton International, Inc., New Iberia, Louisiana: Ruth Hohnstein, October 20, 1988 and Brian Leatherman, October 23, 1998 (explanation provided)

Polaroid Corporation, Assonet, Massachusetts: Michael Conway, September 18, 1998 and Tim Hawes, October 16, 1998 (explanation provided)

Polaroid Corporation, New Bedford, Massachusetts: Richard L. Chandler, September 18, 1998 (explanation provided)

White Rogers Div. Batesville, Batesville, Arkansas: Mark Carroll, September 22, 1998 (explanation provided)

Xerox Corporation, Oklahoma City, Oklahoma: Michael Hampton, September 21, 1998 (explanation provided)

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<sup>1</sup> There are no TRI regulatory definitions of recycling. Facilities may use their own interpretations for purposes of reporting to TRI. Changes in these interpretations do not represent a change in guidance by EPA on how to report recycling.



## ***Chapter 15 — TRI Data for Instruments and Photographic Equipment***



